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The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

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BRIEFLY TOLD.

THE FOURTH MEETING OF THE NATIONAL COMMERCIAL GAS ASSOCIATION.—Concluding our mention of the meeting, as told in the JOURNAL for a week ago. The supplementary session for Thursday (the 10th inst.) was interesting from a technical standpoint, many matters respecting residuals—such as the commercial handling of coke and other by-products—coming in for a good share of attention. The paper list was gone through with satisfactorily, the remaining numbers furnishing plenty of matter for spirited discussion. Unfortunately, the paper by Mr. Henry L. Doherty, of New York, on "Exhibition of Appliances a Necessity in Purchasing," was not read by the author, who was suffering from a bad throat. His substitute (Mr. Stannard), however, presented its facts in good style. In the discussion, Mr. Paul Doty had quite a bit to say. As is usual with him, he spoke well and to the point. The dinner shared in the evening of Thursday was a pronounced success. The tables, which were spread in the large dining room on the ninth floor of the Auditorium, were surrounded by 246 guests. The proceedings were entirely informal; in fact, the function really had every appearance and feature of a family gathering. In the regrettable absence of Secretary Bigelow (whose bereavement was noted by our correspondent last week), the details of the affair were well undertaken and carried out by Mr. H. D. Schall, of the Detroit Stove Works. Prominent at the main table were Mr. and Mrs. E. G. Cowdery. It should also be added that the Chicago Section of the Illuminating Engineering Society were the guests at dinner of the Commercial Association, and that the former subsequently held a regular monthly meeting in the Armory, despite the blare and crushing of the crowds that came to look over the exhibits. The exhibition was continued after the meeting was brought to an end, and it is estimated that 200,000 people reviewed it. In fact, the grandness of it all was capped the morning of Saturday (12th inst.), in the statement made by a Chicago morning daily, that the exhibitors were well repaid for their efforts and expenditure, in that during the five days sales to the value of $5,000,000 had been made by them. Possibly so; of course, we hope so. The greatest praise should be accorded the executives of the Peoples Gas Light and Coke Company for their willingness to respond favorably to any demand made by those in charge of the exhibition. In fact, we imagine the service division were giving the preference to orders from the exhibitors rather than to those sent in the ordinary way. The next meeting will be held in Philadelphia. As a last word, it was reserved to close this with the remark that no praise is too great to give to Mr. John C. D. Clark, of the Peoples Gas Light and Coke Company, for his active, successful connection with the Chicago meeting of the National Commercial Gas Association.

CURRENT MENTION.—

WRITING under date of the 14th inst., Mr. J. M. Shade, Secretary and Treasurer of the P. H. & F. M. Roots Company, reports that Mr. E. D. Johnston, President and General Manager of the Company, who on last Thanksgiving Day underwent a serious surgical operation for the removal of an abscess, is recovering satisfactorily. There is no doubt of his ultimate return to business. In fact, so well has he been progressing that his enforced retirement will happily be much shorter than was at first thought.

THE Western Gas Construction Company has recently completed a 3-lift storage holder, resting in steel tank, for the Lincoln (Neb.) Gas and Electric Company, the retaining capacity of the vessel being 500,000 cubic feet. During the last few months the Company has also put in at Lincoln a 7-foot 6-inch extended carburetter water gas apparatus, which has been satisfactorily at work since October 15th. The Construction folks are also completing for the Lincoln folks the repairing of a steel tank holder up to retaining 200,000 cubic feet. The contract with the Chickasha (Okla.) Gas Company is completed. It included a 5-foot, double-superheater water gas set complete, with boiler, exhauster and purifiers. Also, a 30,000 cubic feet capacity, single-lift, steel tank gasholder, to be used as a relief holder for the

new set. The business of the Chickasha Company, however, is said to be increasing with such leaps and bounds that the water gas set was a prime necessity to enable it to properly supply the demand during the season. It is likely that the Chickasha Company will increase the capacity of its coal gas benches in the near future.

THROUGH the courtesy of Mr. H. L. Griggs, Sales Manager of the Bristol Company, we are in receipt of the Company's new "Bulletin" No. 100, which describes the combination indicating and recording unit of the Wm. H. Bristol electric pyrometer. The purpose of this combination unit is to provide an indicating instrument for the operator at his post of duty and a recording instrument for the superintendent at his office, even at a distance from the point at which the temperature is being measured. That these special combination pyrometers have already proved very practical in manufacturing or industrial plants generally would seem well vouched for, when it is noted that one large steel company has in successful operation 22 of them.

THE next monthly meeting of the American Society of Mechanical Engineers will be held in the Engineering Societies' Building, Tuesday evening, January 12. The paper will be by Mr. Carl G. Barth, of Philadelphia, upon "The Transmission of Power by Leather Belting," illustrated by lantern slides. It will be a comprehensive summing up of the theory and practice of belting, in which conclusions are drawn from the work of Messrs. Lewis, Bancroft, Bird and others, who have made experiments upon the transmission of power by belting. Valuable charts have been prepared by the author for the solution of belting problems. Mr. Barth's long experience in the scientific running of machine tools, in connection with the introduction of improved shop methods, has shown the need of definite data for the application of belting to machinery and led to the development of the results contained in his paper. His data have been applied to belting in different plants for many years, giving an unusual opportunity to study the problem in great detail.

"A. J. C." incloses the following, from North Adams, Mass., under date of the 17th inst.: "Special meetings of the Directors of the North Adams Gas Light Company, the Adams Gas Light Company, Williamstown Gas Company and Stamford Light, Heat and Power Company, to receive the resignations of the old Directors and elect new Boards, were held at the offices of the respective Companies on the 14th and 15th insts. The new Boards will consist of the following named men: President, Alfred Clarke; Vice-President, Arthur E. Childs; Treasurer, Addis M. Whitney; Clerk, George F. Howland; C. Frank Whittemore, C. Neil Burnell, all of Boston, and C. D. Houghton and John Tudor, of Stamford, Vt.

"The first three named men are Trustees of the Massachusetts Lighting Companies, Mr. Childs being President of the Board of Trustees and also President of the Light, Heat and Power Corporation. Alfred Clarke is President and executive head of the 14 Gas and Electric Companies comprising the Massachusetts Lighting Companies, having a combined capital value of more than $2,500,000. Mr. Whitney is Treasurer of the above named Companies.

"M. A. Maxwell has charge of the engineering and active operation of the several companies, and will remain in town for some days, acquainting himself with the details of operation of the local plants.

"Col. F. S. Richardson, the retiring Treasurer and General Manager of the North Adams Gas Light Company and allied companies, is an old and intimate friend of President Clarke and the other officers. The policies of Col. Richardson will be continued with but slight modification. President Clarke has requested Col. Richardson to maintain his close relations with the companies and employees as long as he possibly can, not only to aid Mr. Clarke, but to assist in continuing the policies. Mr. Clarke has decided not to make any change in the employees who have been in the service of the Company for considerable periods and have won the confidence of the Company. It will depend entirely on the attitude of the incumbents whether or not a vacancy occurs."

THE new filtration plant for the Scranton (Pa.) Gas and Water Company will cost well over $60,000.

THE Americus Railway and Light Company have purchased the complete possessions of the Americus (Ga.) Illuminating and Power Company. This means that all the public service corporations of this go-ahead Georgia town will be operated by the syndicate of whom Mr. W. A. Dodson is the executive head.

THE capital stock of the New Britain (Conn.) Gas Light Company is now $400,000. It was $300,000.

High Pressure Gas Distribution.

[Written for the Third Annual Meeting, American Gas Institute, by MR. JACOB D. VON MAUR, St. Louis, Mo.]

INDEX OF EXHIBITS.

Exhibit A.—Map showing mains 10-inch and over, as true of 1903.
" B.—Ideal square mile.
" C.—Map showing mains 10-inch and over, as true of January 1, 1908.
" D.—Pressure charts taken before system was installed.
" E.—Pressure charts in same territory after system was installed.
" F.—An ideal square mile of mains.
" G.—Typical high pressure manhole as used in St. Louis.
" H.—Typical charts taken from manholes located in city.
" I.—Typical chart showing pressure at outlet of compressors of St. Louis County Gas Company.
" J.—Ideal square mile for medium size towns.
" K.—Ideal belt line for medium size town.
" L.—Ideal square mile having a 2-inch wrought iron main distribution system.
" M.—Some types of district and individual consumer's governors.
" X.—Charts taken from a manhole supplying mains which are not connected with the mains in other parts of the city, so that the pressures are entirely controlled from the manhole.

Distribution Systems.—When the writer was first asked to write a paper on the subject of "High Pressure Distribution" it was intended to describe the present stage of the development of strictly high pressure distribution; but, in order to discuss the subject intelligently, it is obvious that all of the various other systems of distribution must be first considered. Gas distribution, in the broad sense, has developed according to the laws of evolution; that is, each system had been evolved as a modification of some existing system. This is shown by the following list of the various distribution systems now in use either as a whole or in part:

(A.) Distribute with low pressure from holders placed at the works only.

(B.) Distribute with low pressure, with both station holders and district holders.

(C.) Distribute with low pressure, but supply district holders through medium or high pressure lines.

(D.) Distribute with low pressure, the low pressure mains being reinforced from manholes located along a belt line carrying medium pressure—1 to 5 pounds.

(E.) Low pressure distribution, the mains being reinforced from manholes located on a belt line carrying high pressure 20 to 40 pouuds.

(F.) Combination pressure, such as is in use in Grand Rapids, which the pressure is raised at the works and individual governors used in the district near the works, the idea being to eventually carry the whole system at medium pressure, using individual house governors.

(G.) Consummation of the above idea, where the entire city is supplied through mains carrying medium pressure, individual governors being placed on the end of each individual service.

(H.) Strictly high pressure throughout—20 to 40 pounds.

In general, high pressure systems would contemplate the use of small wrought iron mains, and would carry pressure in excess of 20 pounds per square inch, and medium pressure installations would contemplate either wrought iron mains or cast iron mains, depending on local conditions, and would carry pressures from 1 to 6 or even 10 pounds per square inch.

A glance at the above list will show very plainly the evolution of gas distribution. From the original, or low pressure distribution, through the various modifications, using part high pressure and low pressure, we finally reached all high pressure, both in mains and services, the latter being equipped with individual house governors throughout. Each system has its special advantages, provided the system is adapted to the particular town or city in which it is used. There can be no fixed rule as to which system is the best that would apply to all cities.

APPLICATION OF SOME OF THE ABOVE SYSTEMS TO CITIES OF VARIOUS SIZES.

It would be a comparatively easy matter to assume a city of a certain size which has never been piped for gas, and then figure out the most economical method of distribution for that particular city, but as such a condition would probably never confront us, except in very rare cases, such as Gary, Ind., it will be best to consider cities as we

1088-A.

MAP
OF THE
CITY OF ST. LOUIS

AS ESTABLISHED BY THE CITY CHARTER OF 1876.

PREPARED UNDER DIRECTION
OF
J. C. TRAVILLA,
STREET COMMISSIONER.

SCALE
0 ¼Mi. ½Mi. ¾Mi. 1Mi.

N.

CITY LIMITS OF 1876

CARONDELET PARK

TOWER GROVE PARK

Missouri Botanical Garden.

LAFAYETTE PARK

CEMETERY

CALVARY CEMETERY

BELLEFONTAINE CEMETERY

MISSISSIPPI RIVER

WHARF

EXPLANATION.

Streets shown with dotted lines are "not" public highways.

EXHIBIT "A"—MAP SHOWING MAINS 10-INCH AND O

EXHIBIT "A"—MAP SHOWING MAINS 10-INCH AND OVER, AS TRUE OF 1905

CEMETERY.

CALVARY

BELLEFONTAINE CEMETERY.

O' FALLON PARK

FAIR GROUNDS

RIVER

MAP

OF THE

CITY OF ST. LOUIS

AS ESTABLISHED BY THE CITY CHARTER OF 1876.

PREPARED UNDER DIRECTION

OF

CHAS. VARRELMANN,

STREET COMMISSIONER.

SCALE

0 ¼Mi. ½Mi. ¾Mi. 1Mi.

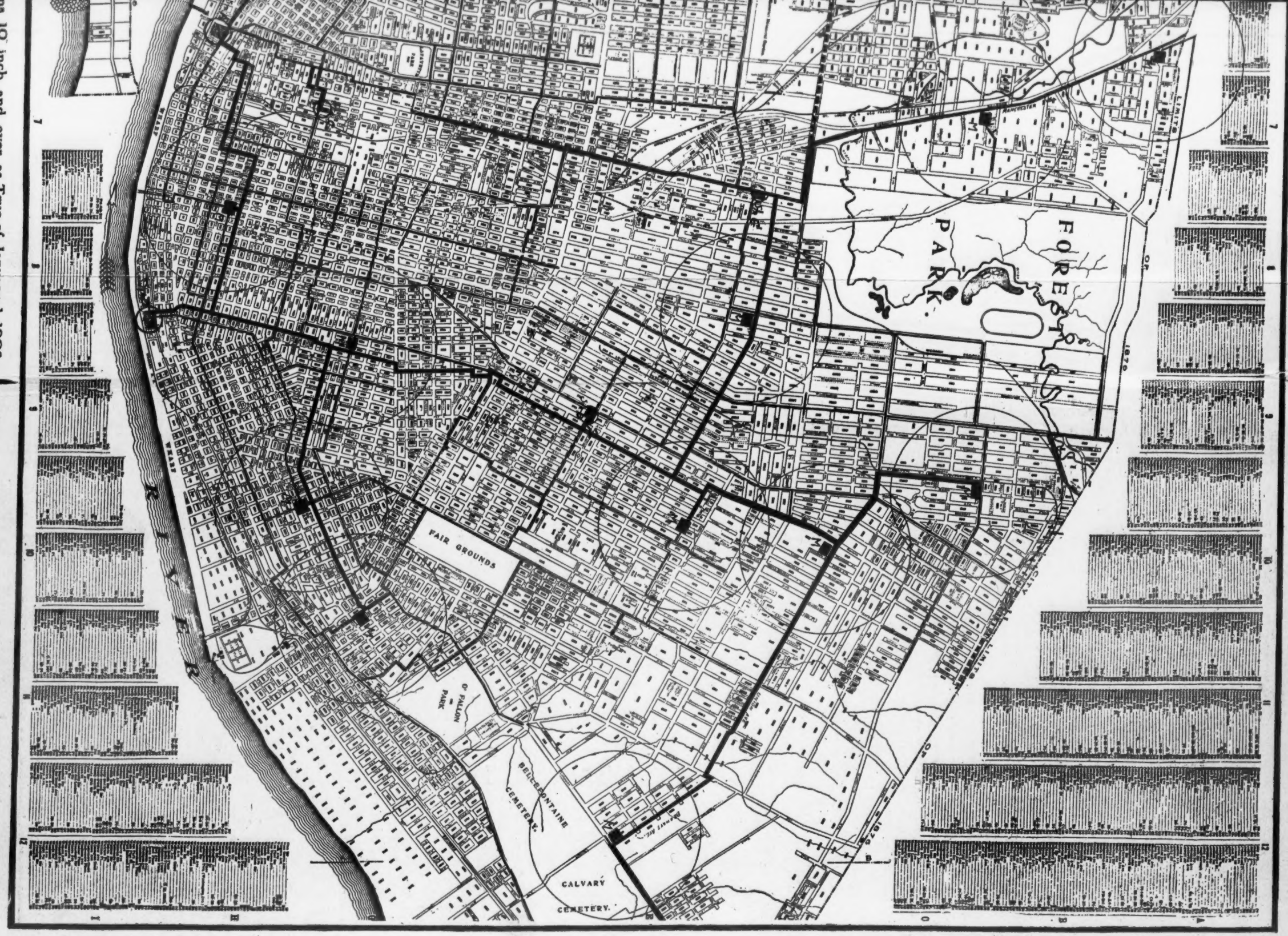
EXPLANATION.

Streets shown with dotted lines are "not" public highways.

EXHIBIT

EXHIBIT "C"—Map showing Mains 10 inch and over as True of January 1, 1908.

ns 10' inch and over as True of January 1, 1908.



1058-B.

actually find them. The practical question which will confront most gas companies at some date in the future will more likely be: "What changes can be made in the existing system of distribution to permanently take care of all future needs of the city?"

St. Louis.—We will take first the larger cities, namely those of 500,000 inhabitants and upward, of which St. Louis might be taken as a fair example. A description of what has been done, and what results have been accomplished there, may be of interest.

Up to the year 1903, St. Louis distributed gas by the method shown in C of the above table, namely, where the gas is distributed from station and district holders through gas mains carrying low pressure gas, the district holders being supplied through mains carrying medium pressure gas.

Map marked Exhibit A shows all the gas mains 10 inches and over which were in the city at the beginning of the year 1903. At this time the territory supplied comprised an area of approximately 26 square miles. The business had not been developed to anywhere near its possibilities, even in this territory, and the pressures in various parts of the city were decidedly inadequate, and the service altogether unsatisfactory. The main shown, connecting Stations A and G, is 16-inch in diameter, and was used exclusively to carry gas from Station A to Stations G and C. The main shown from Station B to Station D was a wrought iron main 12-inch in diameter, laid with converse joints, and was used exclusively to supply the holder located at Station D from the Station B works.

The following table shows the mains in use in the spring of 1903:

Twelve miles of 2-inch; 100 miles of 3 inch; 211 miles of 4-inch; 91 miles of 6-inch; 25 miles of 8-inch; 24 miles of 10-inch; 21 miles of 12-inch; 10 miles of 16-inch; 8 miles of 20-inch; 4 miles of 24-inch; $\frac{3}{10}$ of a mile of 30-inch, or a total of 506.3 miles of main, having an average area of a pipe 6.73 inches in diameter.

Our problem was to extend the gas service to all points in the city where the demand for gas existed, and to do so in the most economical manner, and at the same time give a much improved service.

Deducting the main leading from Station A to Station G, and the main from Station B to Station D, which were pumping mains, the total mileage of pipe 12 inches and over amounted to only 27 miles, practically all of which was cast iron, and carrying low pressure gas. In view of the fact that the city was rapidly developing in all directions, and particularly so in the northwestern and southwestern portions of the city, it is apparent that the mains in existence were entirely inadequate.

Mr. E. G. Cowdery was then General Manager of the Laclede Gas Light Company, and it was his idea to surround the city with a belt line carrying medium high pressure gas, and to connect to this belt line all the works and holders, and to install at various points manholes in which would be placed governors which would take the gas away from the high pressure mains and deliver it to the low pressure mains.

In connection with Mr. W. A. Baehr, Chief Engineer of the Company, it was decided to eventually install a manhole in the center of each square mile of territory, and to lay low pressure mains which would conform very closely to the mains shown on Exhibit B, from which it will be seen it was intended to lay 12-inch mains 1 mile apart, then parallel to these mains three 4-inch mains would be laid, then a 6-inch, then three 4-inch, then another 6-inch, then three 4-inch, then a 12-inch, and so on. On the cross streets all the mains would be 4-inch, except that at the mile points a 10-inch main would be laid, and at the ½-mile points a 6-inch main would be laid. The manholes would be located in the center of these square miles.

Exhibit C is a map showing all mains 10 inches in diameter and over at the end of 1907. The heavy black lines represent mains carrying medium high pressure; that is, 5 pounds per square inch. The main from Station B to Station D was practically all abandoned, both on account of its size and also on account of the fact that it had deteriorated to the extent that it was unsafe to carry gas. The heavy black squares marked *M* represent high pressure manholes. The endeavor was made to adapt the original layout on the ideal square mile, shown on Exhibit B, to the existing mains. The table given below shows the mileage of each size main, for both high pressure and low pressure mains, as true of January 1, 1903, and January 1, 1908.

From the table it will be noted that the average diameter of the high pressure mains increased from 14.42 inches to 17.56 inches, whereas the average diameter of the low pressure mains increased only from 6.54 inches to 6.80 inches, and the average diameter of all the mains in the entire city increased from 6.73 inches to 7.7 inches.

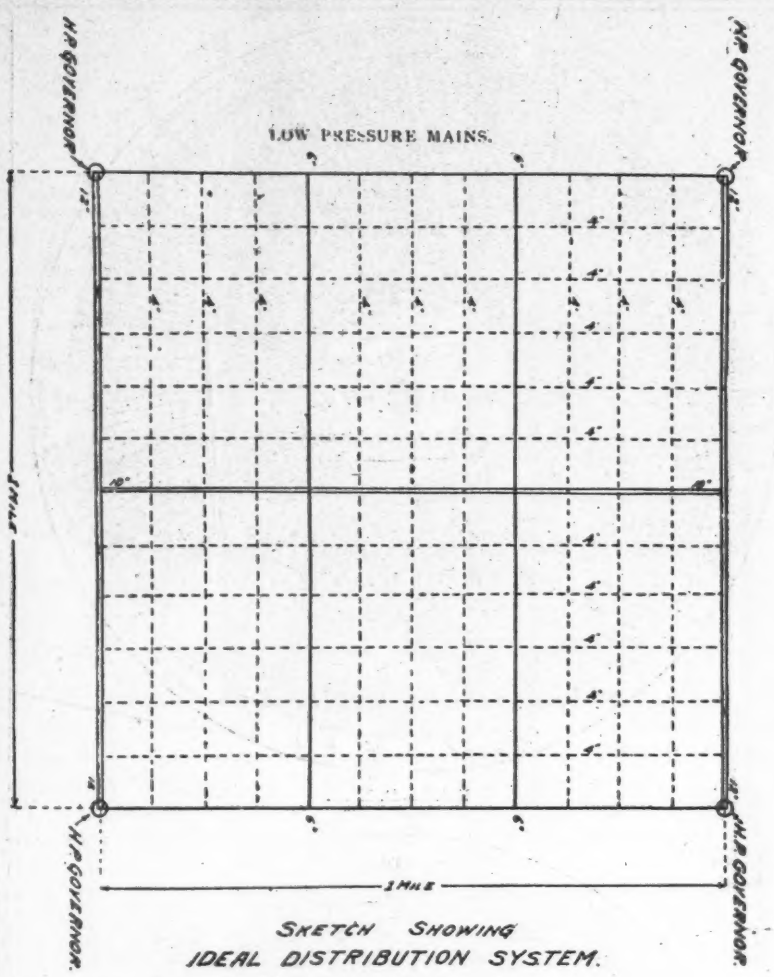


Exhibit B.—Ideal Square Mile.

Size. Inches.	1903. Low Press. Miles.	1903. High Press. Miles.	1903. Low and High Press. Miles.	1908. Low Pre s. Miles.	1908. High Press. Miles.	1908. Low and High Press. Miles.
2	12	....	12	9	....	9
3	100	....	100	78	....	78
4	211	....	211	358	....	358
6	91	....	91	180	....	180
8	25	....	25	25	....	25
10	24	....	24	80.6	3 4	34
12	18	3	21	43 4	1.6	45
16	6	4	10	9.3	9 7	19
20	8	....	8	11	....	11
24	4	....	4	6	14	20
30	0.3	....	0.3	0.7	0 3	1
Total..	499.3	7	506 3	751 0	29 0	780
Average Area. Sq. Ins.	33.822	163.36	35.613	36.3108	308.399	46.4285
Average Diam. Inches.	6.54	14.82	6.73	6.80	17.56	7.7

It must be remembered that the increase in the average diameter is very largely due to the fact that 14 miles of 24-inch belt line were laid during the years 1903-04-05. The dotted portion of the belt line represents approximately 4 miles, and when this is completed very little additional 24-inch pipe will be needed for many years to come. It is the intention to eventually build a large works in the extreme southeastern portion of the city, at which time the belt line will have to be connected to this works.

Exhibit D is a batch of pressure charts taken in the square mile shown in the lower right-hand corner of Exhibit C, with Hyde Park as a center, and before the manhole at at this point was located.

Exhibit E shows pressure charts taken during 1908, in this same territory, after the system was fully installed. These charts speak for themselves, and show how nearly the results predicted were obtained.

I draw your attention particularly to the charts taken at the Mallinckrodt Chemical Works, located within a block of the Broadway locations of the Exhibit D charts. During the year 1903, this plant was forced to shut down on a number of occasions, owing to

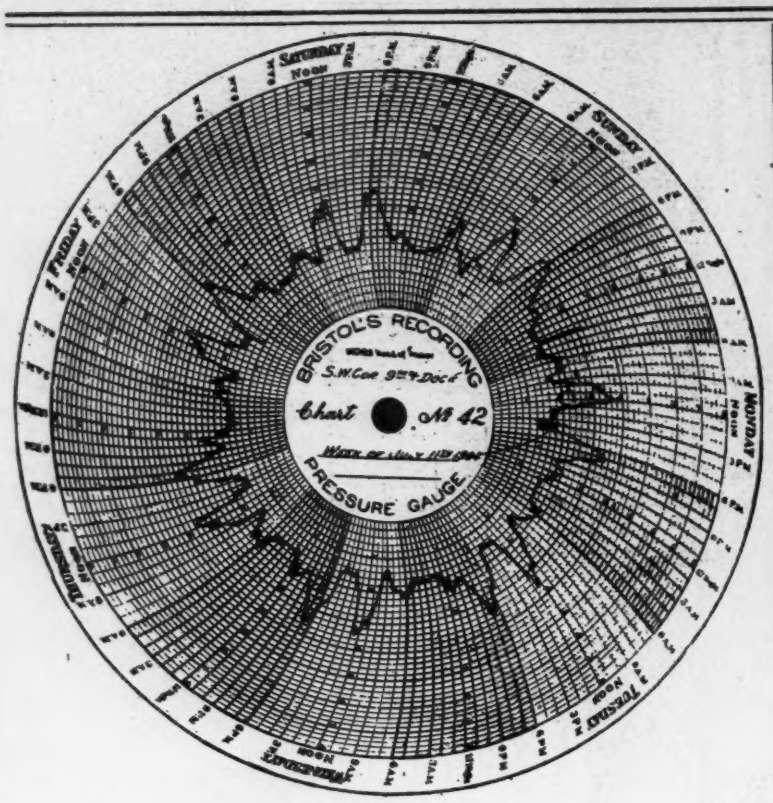


Exhibit D, No. 1.

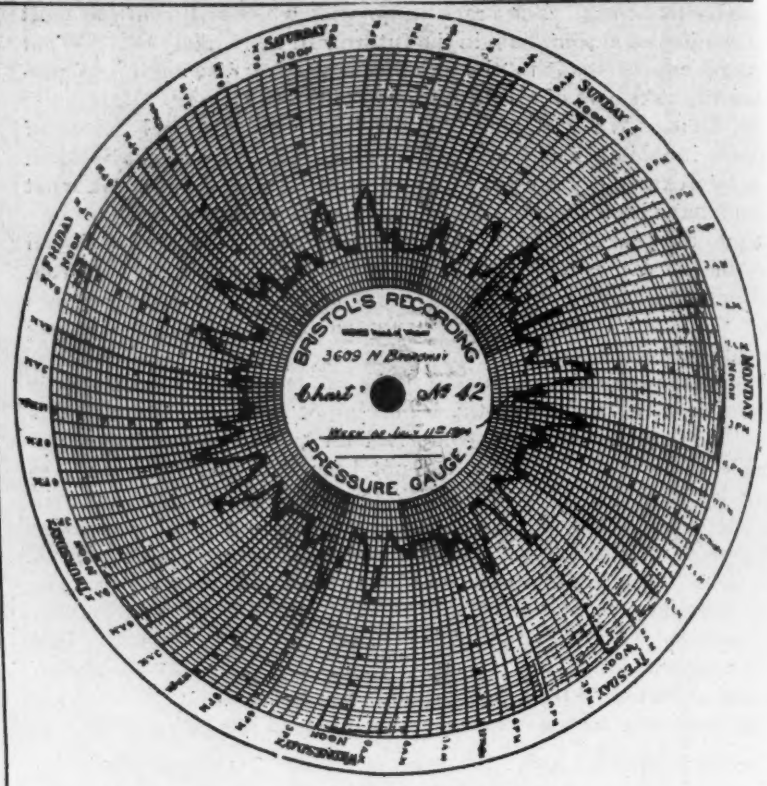


Exhibit D, No. 3.

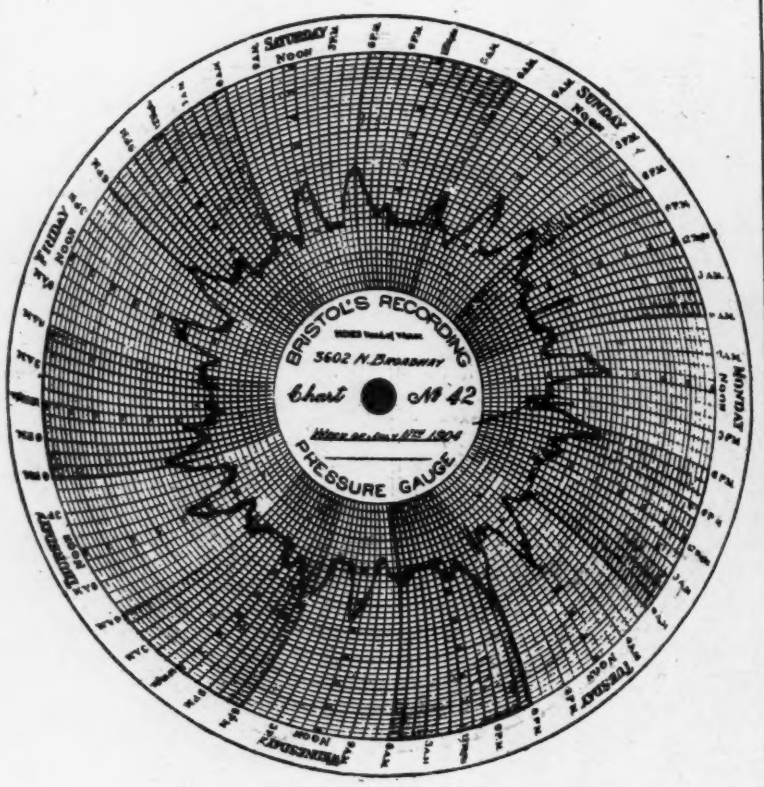


Exhibit D, No. 2.

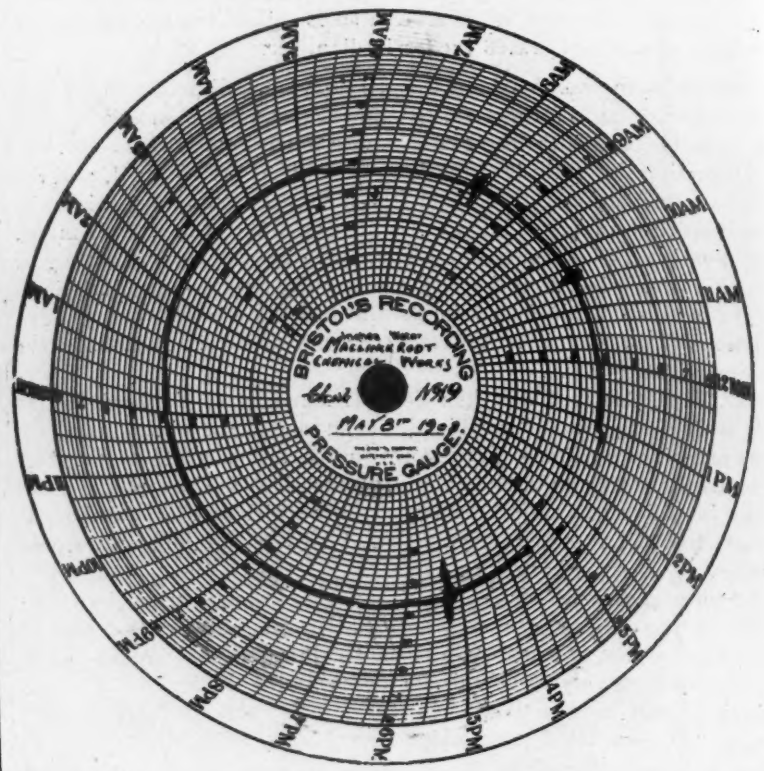


Exhibit E, No. 1.

the inadequate supply of gas. At the present time the supply of gas in this district is well nigh perfect, as the variation does not exceed $\frac{4}{10}$-inch in 24 hours.

The territory in St. Louis at present supplied now covers an area of over 36½ square miles, and the service rendered is satisfactory in all parts of the territory where the method as described above has been applied. When the system is extended to the entire city it is fair to assume that the variations in pressure will be under the strictest control, except, of course, where elevations of the ground surface are sufficient to cause excessive variations.

Exhibit F is intended to show an ideal system for a square mile where buildings face all four sides of each city block. Mr. Cowdery originally estimated for St. Louis that the supply for every square mile should be based on a peak load of 100,000 cubic feet per hour. While this may seem excessive to some, the principles involved are the same whether we assume this figure or some other.

The ideal square mile as shown on Exhibit F is a modification of that shown on Exhibit B. It is to be noted that the two squares immediately surrounding the manhole are made of 4 inch pipe, the following two squares are made of 6-inch pipe, whereas the outside or mile square is made of 8-inch pipe. Bisecting the square, there there are two mains at right angles, each 12-inch in diameter.

Such a system will handle a peak load of 100,000 cubic feet per hour with a variation of not to exceed 1 inch of water pressure from maximum pressure to minimum pressure at any time in 24 hours, exclusive, of course, of variations caused by difference of elevation. This variation will only be for a short time at peak load and will be practically uniform throughout the balance of the 24 hours. The pressures that may be expected at peak load are shown on the exhibit.

It is obviously not practicable to adapt this system to an existing system in its entirety. The problem consists in first locating the proposed manholes at various points in the system as near 1 mile apart as practicable, taking advantage of the existing large mains, and then laying out a belt line which will connect all of the holders and manholes.

The question naturally arises—"Was the system, as installed, the most economical that could have been designed?" This question can best be answered as follows:

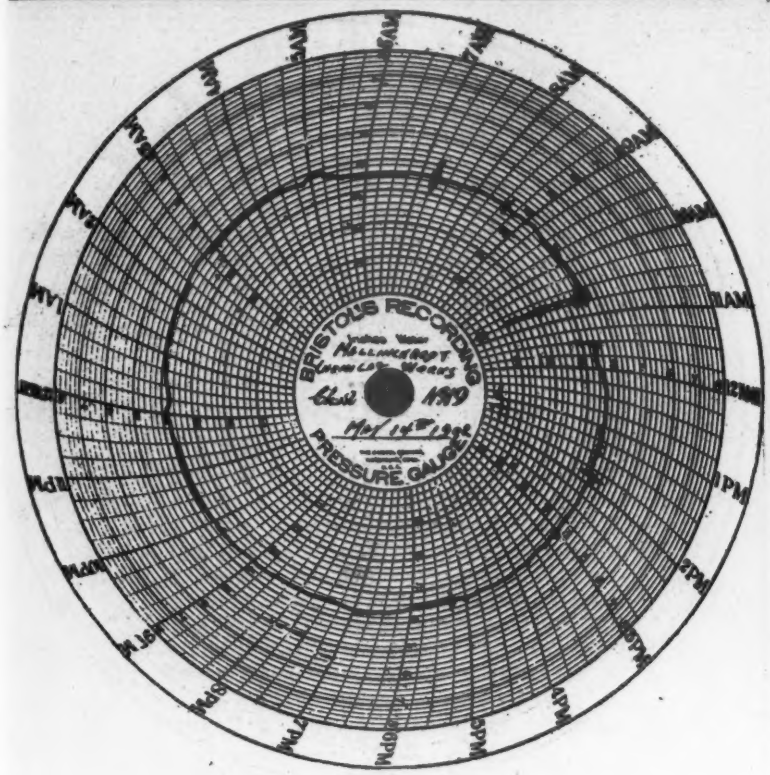


Exhibit E, No. 2.

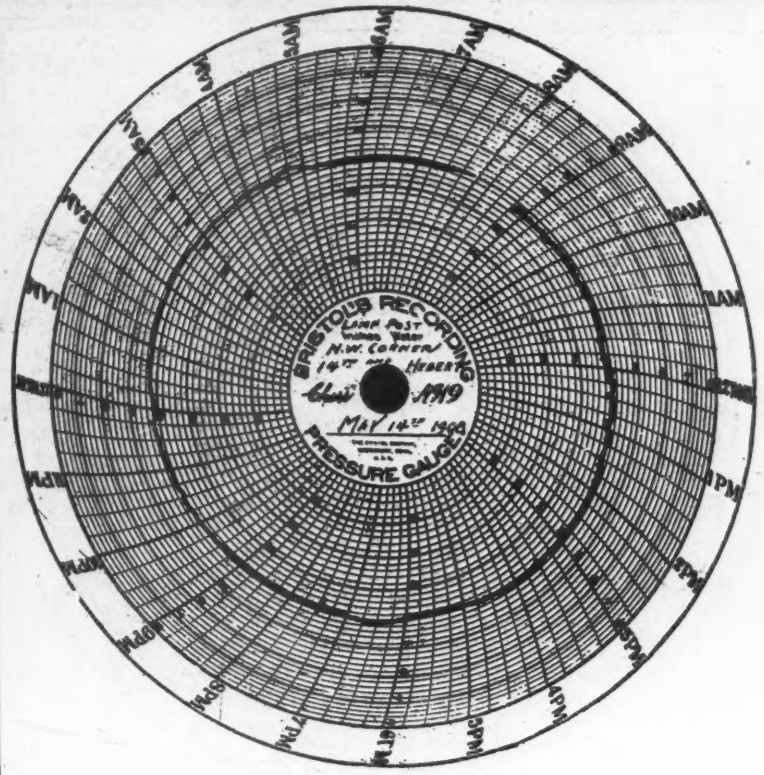


Exhibit E, No. 4.

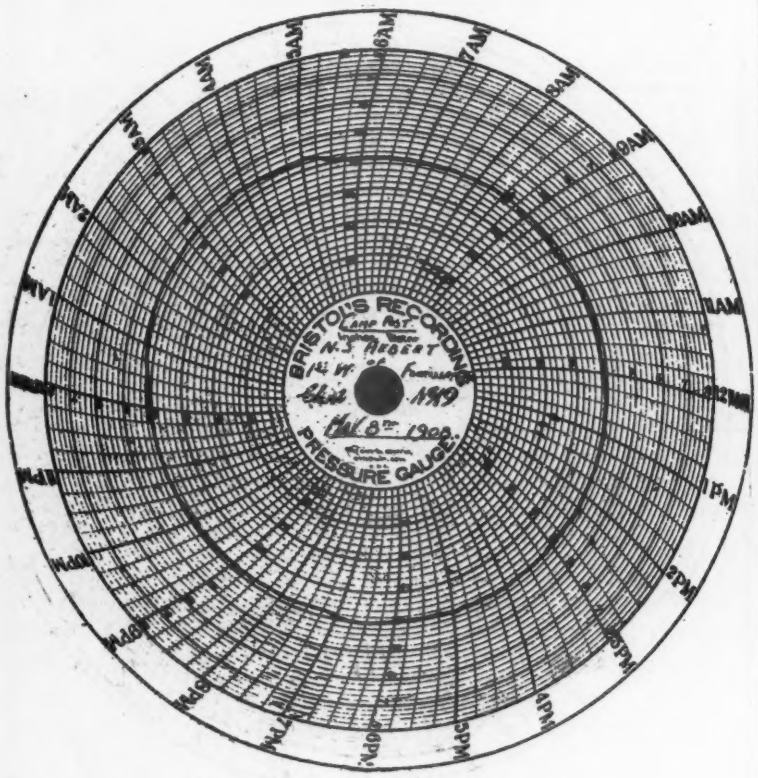


Exhibit E, No. 3.

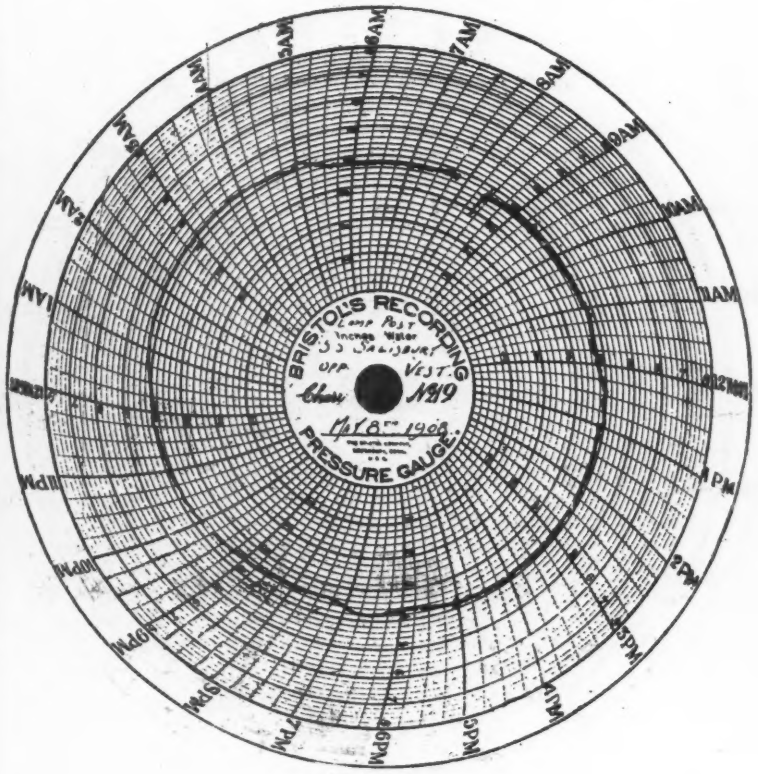


Exhibit E, No. 5.

Taking the low pressure mains in the square mile as shown on Exhibit F, where all streets are covered with mains, we find the cost to be as follows:

Assume for simplicity the following unit prices:

12-inch main	.....	$2.00 per foot.	
8- " "	.....	1.25	"
6- " "	.....	.90	"
4- " "	.....	.60	"

The total cost will then be as follows:

10,560	feet of	12-inch	main at	$2.00	per	foot....	$21,120.00
21,120	"	8- "	"	1.25	"	....	26,400.00
29,568	"	6- "	"	90	"	....	26,611.20
54,912	"	4- "	"	60	"	....	32,947.20
116,160	feet.						$107,078.40

or an average of 92 cents per foot. Of course, where a number of square miles are supplied the amount of 8-inch per square mile will be reduced, as each mile of 8-inch will form the sides of 2 square miles. It is safe to say that the mains shown on Exhibit F can be laid in any city comparable with St. Louis at a cost of $100,000 per square mile, or if 6-inch pipe is used instead of 4-inch, the total cost per square mile should not exceed $120,000, and I believe in large cities that this would be the preferable thing to do for many reasons.

These mains can hardly be expected to do any more than supply the particular square mile in which they are located. The problem then is: "What is the most economical method of bringing a peak load of 100,000 cubic feet per hour to the center of each square mile?" A 24-inch main 1 mile long will deliver, at the far end, 117,000 cubic feet of gas, with a drop of 1 inch pressure. A 10-inch main with 4 pounds initial pressure and 2 pounds final pressure will deliver the same quantity of gas through the same length of pipe. A 24-inch main, 4 pounds initial pressure, and 2 pounds final pressure will deliver 1,000,000 cubic feet of gas per hour, through a distance of 1 mile.

While the actual saving is not exactly represented by these figures, yet it must be apparent to anyone that the advantage in first cost is altogether in favor of delivering the necessary gas through high pressure mains.

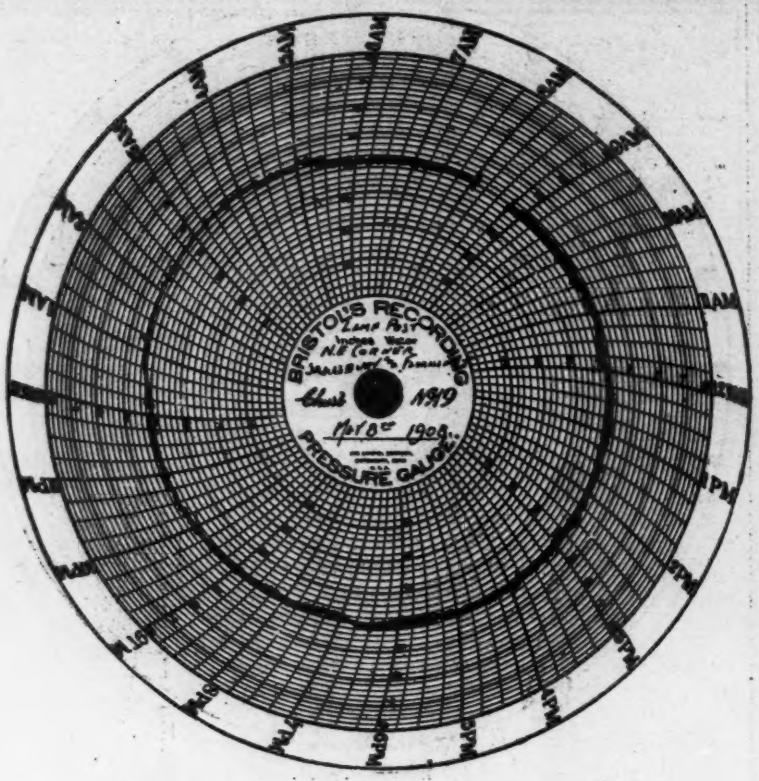
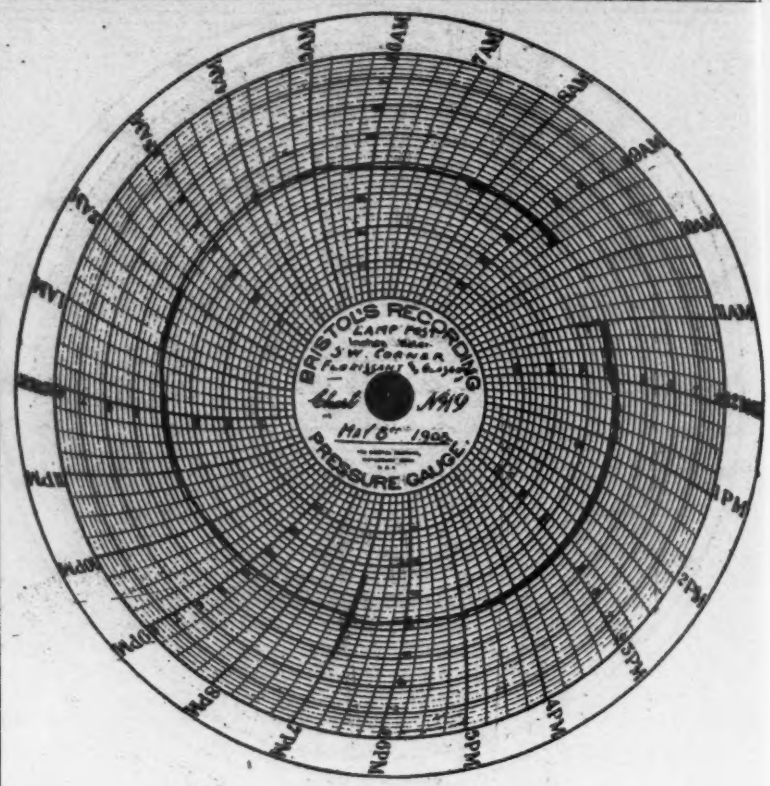


Exhibit E, No. 6.



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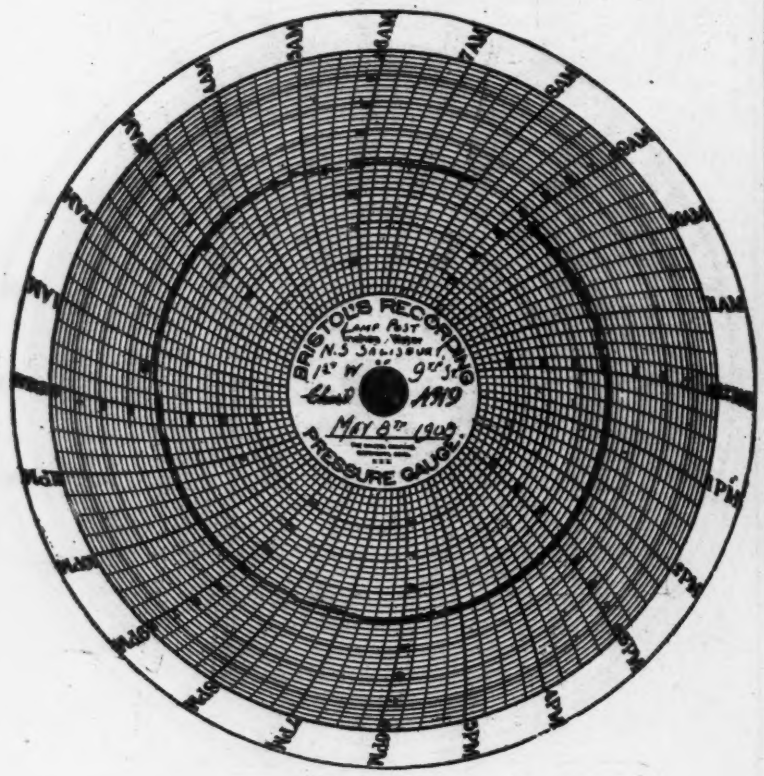

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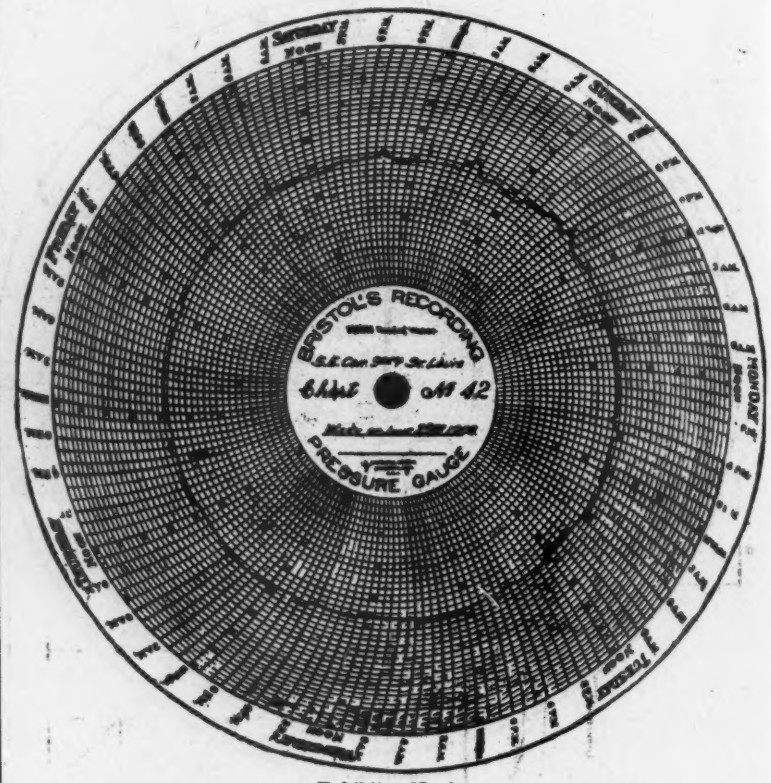


Exhibit E, No. 9.

For instance, in St. Louis, the cost of the strictly high pressure mains was approximately as follows:

0.3 of a mile of 30-inch main at $31,680 per mile... .	$9,504
14 miles of 24-inch main at $23,760 per mile.....	332,640
9.7 miles of 16-inch main at $18,480 per mile	179,256
1.6 miles of 12-inch main at $10,560 per mile.....	16,896
3.4 miles of 10-inch main at $8,000 per mile.....	27,200
29.0 miles.	$565,496
13 manholes at $2,500 each	32,500
Total.....	$597,996

or at the rate of $20,621 per mile.

It must be remembered that the following pipe: 1,500 feet of 30-inch; 47,834 feet of 24-inch; 23,105 feet of 16-inch, and 1,037 feet of 12-inch pipe, would have been used in any event to connect together all the works and holders. The total cost of this pipe was approximately $280,000. We should, therefore, deduct this sum from the total of $597,996, which would leave $317,996 directly chargeable to the strictly medium high pressure distributing mains, which at $4 per foot would only have enabled us to have laid approximately 15 miles of 24-inch mains.

At the present time gas is being supplied to various portions of the city located from 4 to 7 miles from the nearest holder.

To supply even 70,000 cubic feet per hour through a main 6 miles long, and allowing as much as 2-inch drop in pressure, would take a pipe 24 inches in diameter. This one main would cost $21,120 a mile, or a total of $126,720, which is 40 per cent. of all the strictly high pressure distributing mains which were actually laid to supply over one-half of the entire city, and when laid would only supply 70,000 cubic feet per hour at peak load to 1 square mile located at its far end. The chances are that eventually holders would have had to be erected in these distant parts of the city, and the mains leading to them would probably have been as large as our present high pressure belt lines. The belt lines having been once constructed, it is only necessary to run out 12-inch branch lines to the center of any particular district to be reinforced, and a manhole installed to give the same effect as would be given if a gas holder were erected at that point.

An illustration of the value of the system is shown in the case of

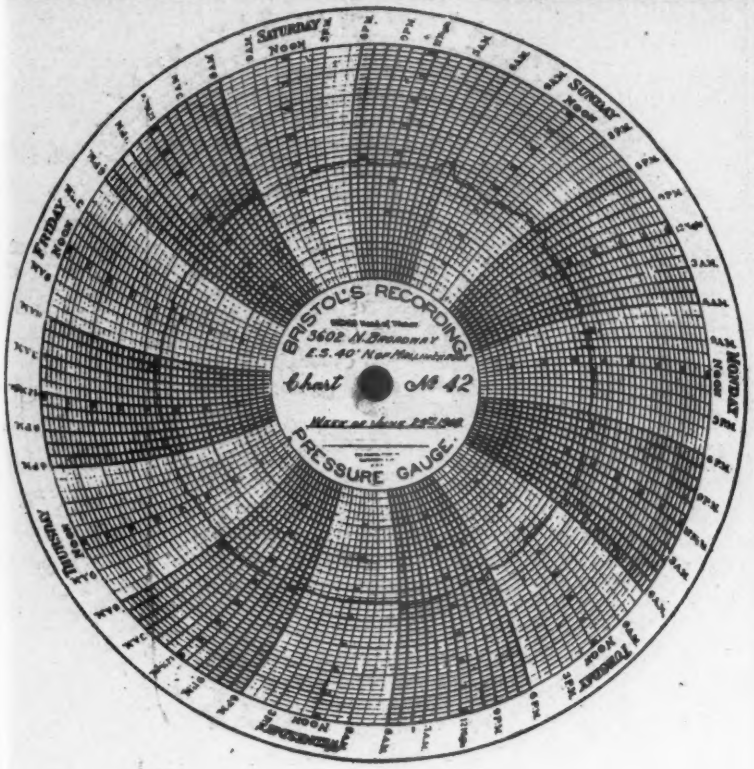


Exhibit E, No. 10.

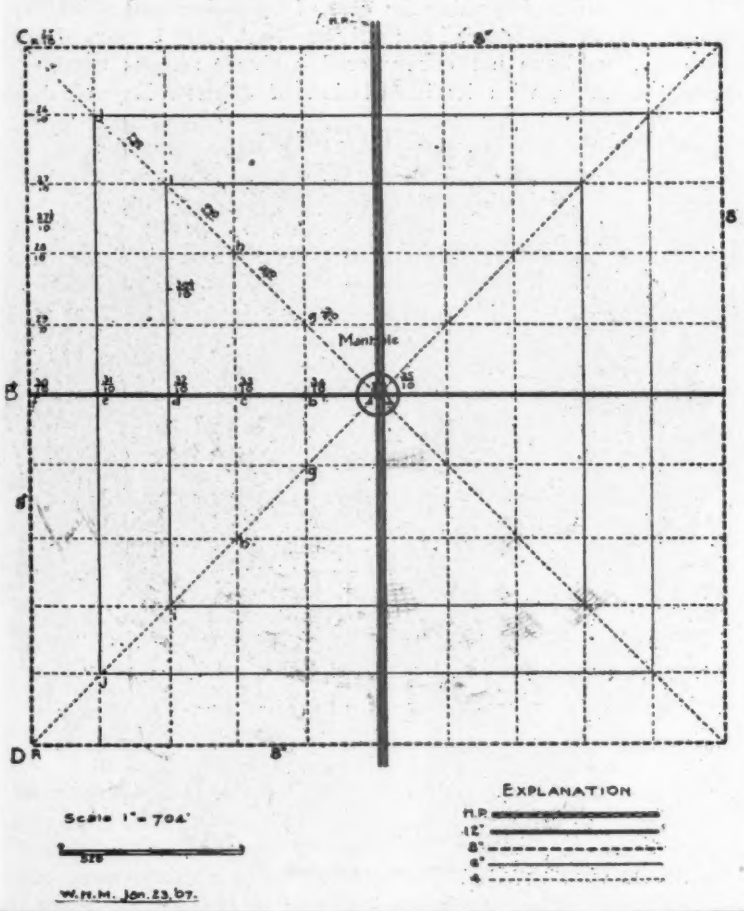
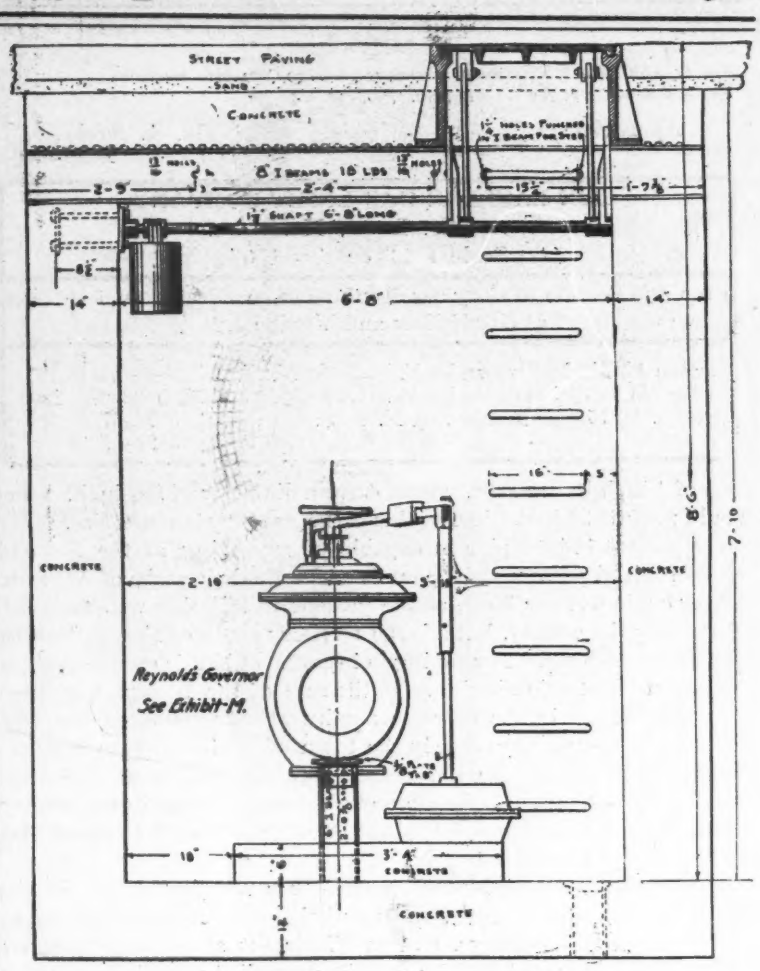
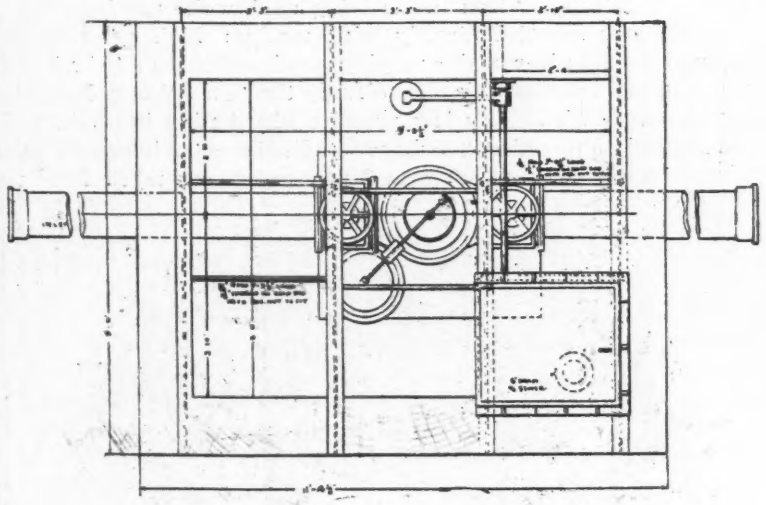


Exhibit F.—An Ideal Square Mile of Mains.

the 16-inch main running out Manchester avenue to the point marked "City Limits," in the southwestern portion of Exhibit C. This main is 4 miles long and supplies not only the 2 manholes located on Manchester avenue, but the entire south one-half of St. Louis county, and ends at the high pressure pumping station located in the town of Maplewood, at which point the gas is pumped to 30 pounds pressure and distributed throughout the county. The actual peak load delivered to the county station through this line at the present time is 35,000 cubic feet per hour. This may be increased to 70,000 cubic feet per hour in the near future, not counting the gas consumed from this same line inside the city limits.

A low pressure main capable of taking care of this load, with a





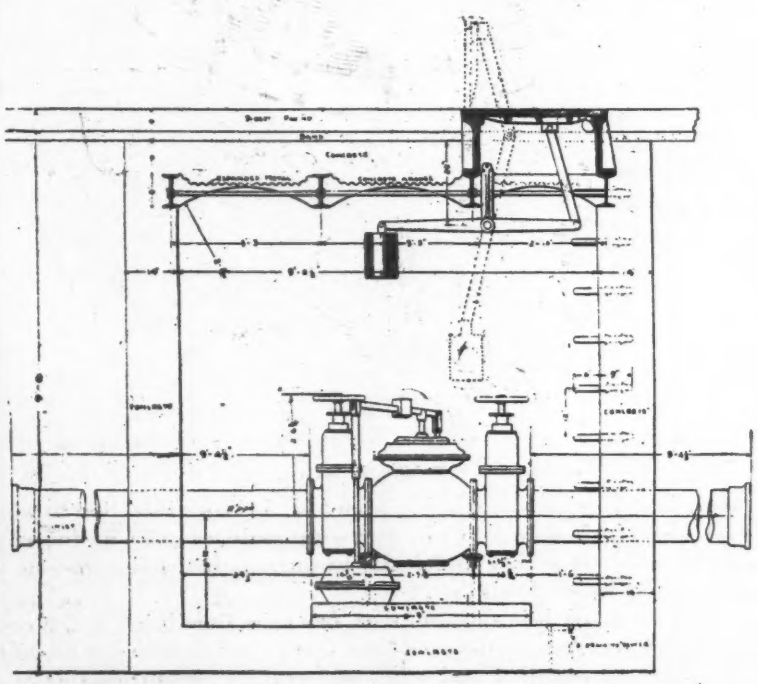


Exhibit G.—Typical High Pressure Manhole, as Used in St. Louis.

Exhibit G.

Note.—Drain Vent Pipe & Gauge Boards required to Complete Manhole.
For Details of Cover See Drawing No. 1,385.

Approved: *W. A. Baehr*, Engineer.

THE LACLEDE GAS LIGHT COMPANY, St. Louis, Mo. Scale 1′ 12″ or 1′ = 1′ 0″			
Plan and Section of Concrete Manhole to be Erected on 5-lb Line at Goodfellow and Vernon Ave.			
Station Manholes	Drawn by F. F. D. & W. H. R.	Date. 4-2-07	
Order No.	Traced by W. H. B.	& 5-28-07	1471
Design. 15	Checked by N. Y. S.	5-28-07	
		5-29-07	

drop of 1 inch in pressure, would have a diameter of 26¼-inch, which would mean a 30-inch pipe, as this is the nearest standard size.

The present 16-inch pipe is capable of supplying, at the far end, with an initial pressure of 3 pounds and a final pressure of 1 pound, 180,000 cubic feet per hour, so the present installation will take care of not only the county, but a large territory south of Forest Park for many years to come. The saving in investment in this case is obvious.

Another illustration is shown in the case of the 10-inch high pressure line shown in the extreme northwestern portion of the city. Here it was necessary to supply the town of Walnut Park, located a distance of 3½ miles from the nearest manhole, shown at Union and Easton avenues, and also the town of Jennings, located in the county, a distance of 2 miles beyond Walnut Park, or a total of 5½ miles from the Union and Easton manhole.

A 10-inch medium high pressure main was run as far as the city limits, on Florissant avenue, and manholes were installed as shown at Florissant and Bernays, and at Florissant and Robin avenues. The territory in these localities was then supplied with low pressure, 4-inch and 6-inch cast iron mains being used, while the far town of Jennings was supplied directly with medium high pressure gas through wrought iron mains varying in diameter from 1¼-inch to 6-inch and the consumers supplied directly through Johnson-Reynolds governors. With strictly low pressure distribution it would have been entirely impracticable to have supplied these territories for some years to come. Exhibit X shows 3 pressure charts taken from the

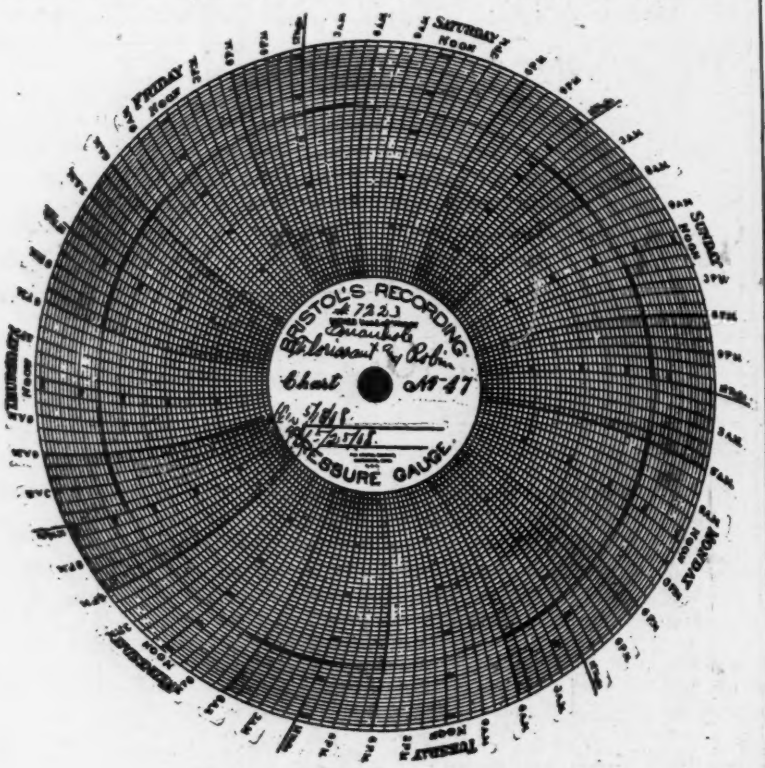


Exhibit X, No. 1.

manhole at Florissant and Robin avenues. It is our intention to convert this 10-inch main into a low pressure main as soon as the city builds up in this section sufficiently to warrant the extension to it of our regular 5-pound belt line.

From the above it is apparent that, from the standpoint of first cost and service rendered to the consumer, there is no comparison between the system as installed and any system of low pressure mains and

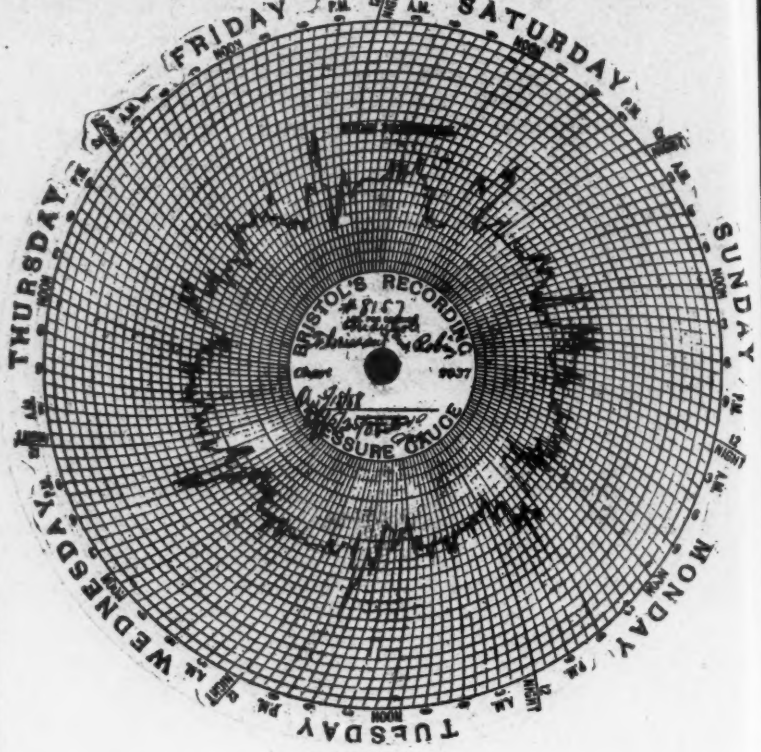


Exhibit X, No. 2.

holders which could have been installed, either in first cost or in operation.

We have still to determine the cost of operation and reliability of service. As to the latter, I can only say that, after 5 years of actual operation, we have not encountered a single serious trouble. A typical manhole, with its installation of Johnson-Reynolds' high

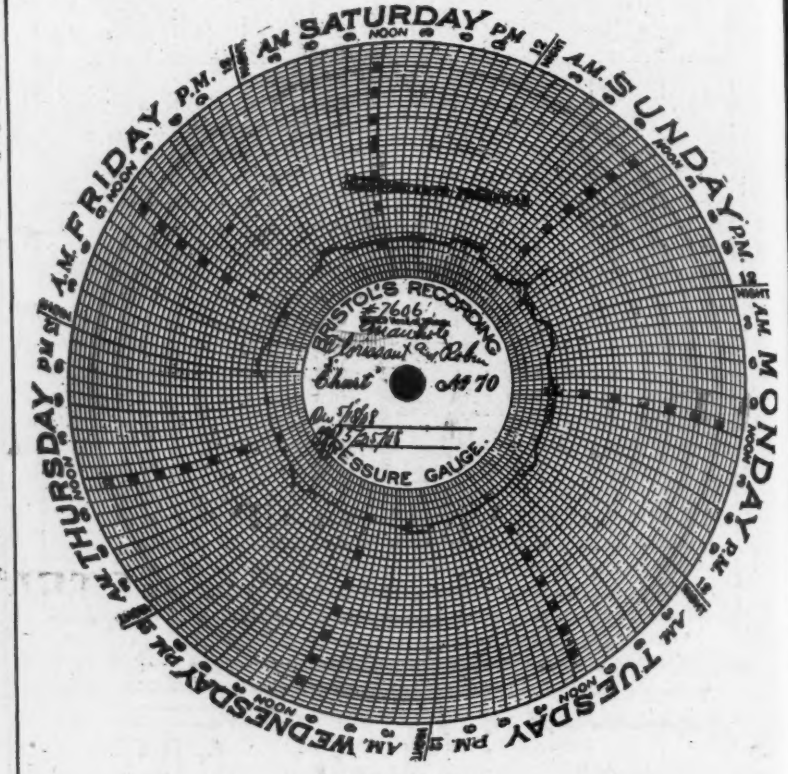


Exhibit X, No. 3.

pressure, single type governor, is shown in Exhibit G. Two men at present take care of 15 manholes, and, with the exception of some slight repairs occasionally, have little to do except to change the charts and keep the manholes and apparatus clean. Originally a mercury type of governor was used, but was abandoned within a few months after its installation, on account of its absolute unreliability. Exhibit H shows typical, high pressure, intermediate pressure and low pressure charts taken from the manholes. From the high pressure chart it will be seen how rapidly the pressures in the high pressure lines fluctuate. The governors respond to these sudden changes perfectly, which was not the case with the mercury governor formerly used.

The worst trouble which we have had was due to valves located

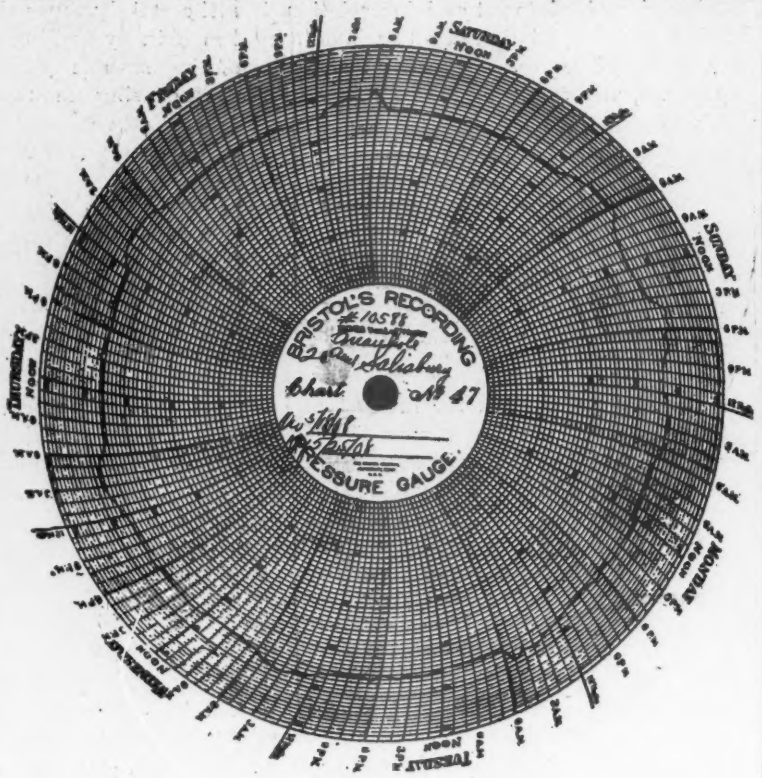


Exhibit H, No. 1.

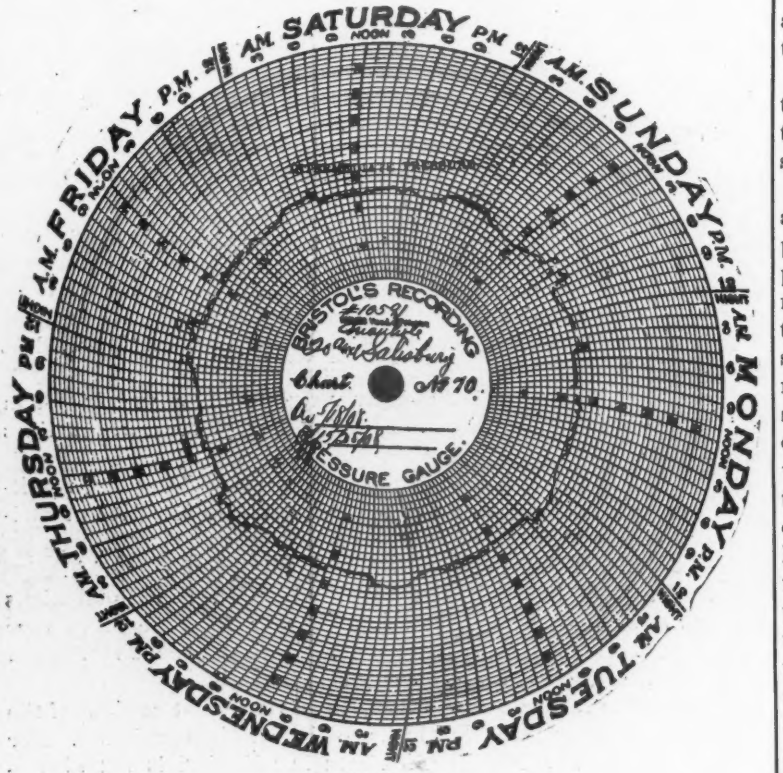


Exhibit H, No. 2.

at various points along the line. Any valve which has the collar in the stuffing box attached to the spindle by a pin only should not be used. The collar should be shrunk or recessed into the spindle or in some manner attached so as to remain tight at all times. On some of the valves that we have used the collar slipped on the spindle and the man operating the valve would be misinformed as to the condition in which he left the valve. No trouble would be experienced until some other valve on the belt line was closed or opened, after which the pressures throughout the line would immediately make manifest that something was wrong on the line. This may seem like a trivial matter, but as a matter of fact it is of the utmost importance, and is the one really serious difficulty which we had to overcome.

To those contemplating installations of distribution systems such as described here, I would recommend that this valve question be given careful attention before deciding on any particular valve. We have overcome the trouble somewhat by keeping a history card of every valve, showing every detail connected with it, and keeping a report of the number of turns which the valve is turned open or shut, every time the valve is operated. In addition to this, every valve is operated at least once a month. Even with this care we have trouble with the valves.

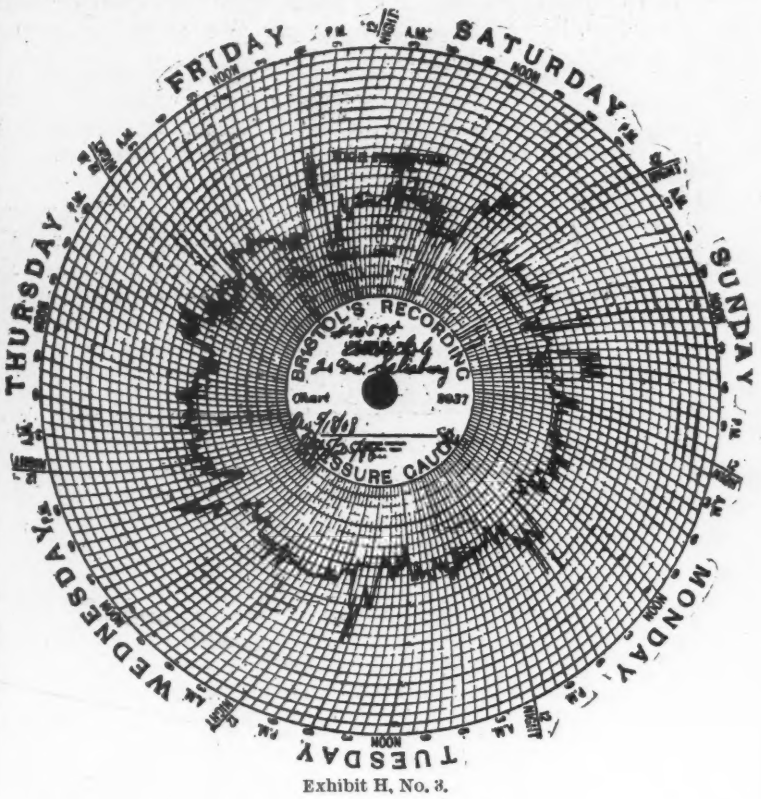


Exhibit H, No. 3.

A history card is also kept of every diaphragm and every valve in the manhole. I believe that one of the elements of our success with this system has been due to the very great care given to all of the small details, valves, drips, diaphragms, gauges, etc.

One would naturally expect that there was an element of danger in a system such as here described, owing to the fact that it might be possible for a governor to break or in some other manner allow high pressure gas to go into the low pressure system, but the greater the number of manholes installed, and the more gas that is distributed through the high pressure system, the less danger there is from this source. For instance: Suppose that one of our manholes in some manner broke and allowed high pressure gas to get into the low pressure system. As soon as this happened the gas at the outlet of all other governors in the system would rise and all other governors would immediately close. Therefore the whole city would be supplied through the outlet of the one governor. The pressure in the system of mains would, therefore, rise gradually and not any damage could hardly result. The men at the various stations would in a very short time detect any cases of pressure which might be built up, and if the pressure continued to rise to the point where it was evident that something was wrong on the line they would immediately stop some of the blowers and reduce the pressure in the high pressure lines. It is difficult to understand how anything very serious could happen, especially on the new type of governor, as the higher the pressure gets in the low pressure mains, the stronger is the tendency to close the valves.

Pumping plants are maintained at 4 different points, as follows:

At Station A there are 4 simple, slide-valve, Erie steam engines, direct connected to 4 rotary Roots blowers, having a displacement of 20 cubic feet per revolution, and a speed of 225 revolutions per minute. The capacity of this plant is about 750,000 cubic feet per hour.

At Station B we have one unit the same as at A, and, in addition, have one 250-horse power, simple, Allis-Chalmers-Corliss steam engine, belted to one Roots positive blower, having a capacity of 450,000 cubic feet per hour against 5 pounds.

At Station G are two Nash gas engines, 150-horse power each. They are 3 cylinder, 4-cycle, single acting, and are gear connected to a rotary blower which has a capacity of 56 cubic feet displacement per revolution. The gas engines run 250 revolutions per minute. The capacity of the plant, with both engines, is 500,000 cubic feet per hour against 5 pounds pressure.

At Station H there is one Westinghouse, horizontal, 2-cylinder, double-acting gas engine, direct-connected to a blower having a displacement of 50 feet per revolution. The gas engine is self-regulating, between 90 and 180 revolutions per minute, and is rated at 300-horse

power. The capacity of the plant is about 450,000 cubic feet per hour. It is, therefore, hardly likely that the service could be interrupted from a breakdown of machinery.

It is remarkable how well the governors act even when the pressure drops to a very low point. At the time of the balloon races in St. Louis we made the experiment of dropping the pressure in the high pressure mains until at the far distant points the pressure at the governor was only 3 inches of water. The pressure was then brought up to 5 pounds, and even with this great extreme in pressures the chart located at the outlet of the governor showed a perfect circle. At first we experienced some difficulty in pumping our drips, but we have since equipped each drip riser with a lever-handle cock, which has satisfactorily overcome all trouble from this source.

The following drip record for 1907 may be of interest as showing the relation between the quantities of drip water taken from drips located on the low and high pressure mains:

Drip Record, 1907.

	Drips in Use.	Visits Made.	Gallons Pumped.	Tons Pumped.	Total Cost.	Cost per Drip in Use.
Low pressure...	2,336	4,983	166,840	695.17	$2,737.70	$1.17
High " ...	76	4,783	820,781	3,419.92	2,640.65	34.64
Total.....	2,412	9,766	987,621	4,115.09	$5,378.35	$2.23

Actual Pumping Cost.

Labor—2 men	6,223	hours at	25 cents.....	$1,555.75
1 man	1,120	"	22½ "	252.00
1 "	2,835	"	20 "	567.00
Total.				$2,374.75
Teams—1,001.2 double teams at $3.....				3,003.60
Total cost pumping.....				$5,378.35

The above costs are exclusive of the cost of supervision or clerical work.

As to the final question, namely, the cost of operation, it is very difficult in our case to separate that portion of the cost of operation, installation, etc., necessitated by the belt line and manhole system of distribution from the similar costs which are necessitated in any event for the purpose of supplying the outlying holders, etc.

It must be borne in mind that had any system of low pressure distribution been adopted the large low pressure mains would not have been run from the works to the districts in which the gas was needed, but would have been run from existing holders nearest to such districts, or, if found advisable, additional storage holders would have been erected at suitable points, and these holders would have been connected to the works by the high pressure pumping lines, and low pressure extensions would then have been made from these holders. This point is very important as bearing on the amount of gas that would have to be pumped by adopting the manhole system of distribution as compared with any other system of trunk lines and holders supplying low pressure mains. The only difference would be that in the manhole system the gas would pass directly from the works into the belt line, thence into the manhole, at which point it would be distributed through low pressure mains at distances approximately ¼ mile from the manhole, whereas in the trunk line and holder low pressure distribution the gas would be pumped from the works into the high pressure mains leading to the holders, from which point the gas would be distributed by means of low pressure mains at distances from 1 to 4 miles from the holder. The amount of gas actually pumped will undoubtedly be greater in the manhole system, but not as much as might appear at first glance.

Another important point that must be taken into consideration is the fact that, as a rule, it is only at peak load when all of the manholes are in active operation. During the periods of low consumption very little gas passes through the manholes. The result of this is that the same machinery employed during the average and low pressure loads to supply the holders may be utilized for supplying the manholes at peak load, by simply closing the valves leading to the various storage holders.

The cost of pumping the gas from the various pumping stations is approximately $\frac{5}{10}$ of a cent per 1,000. As stated above, it is practically impossible to figure out just how much additional gas is pumped, using the manholes, over and above what would have been pumped had holders and low pressure mains been used. It is probable that the amount does not exceed 33⅓ per cent. of the total. This would be for the year 1907, 33⅓ per cent. of 4,000 million equals approxmately 1,300,000,000 cubic feet. If we allow $\frac{1}{10}$ of a cent per 1,000 of the total sendout for interest and depreciation, it will certainly cover the interest and depreciation of all such additional machinery and buildings as would be necessary solely on account of the manhole system. we should, therefore, charge against operation the following amounts:

$\frac{4}{10}$ cent per 1,000 on 1,300,000,000..... =		$6,500	
$\frac{1}{10}$ cent per 1,000 on 4,000,000,000..... =		4,000	
		$10,500	$10,500
Attention to manholes: 1 man at	$1,020	per year.	
1 man at	600	"	
Supervision and maintenance....	780	"	
	$2,400	"	$2,400
			$12,900

Assuming 7 per cent. for interest and depreciation, this amount would represent an investment of approximately $185,000, which could be expended for low pressure mains. At $4 per foot this amount would only be sufficient to lay less than 9 miles of 24-inch main. The total cost, therefore, of the high pressure system is:

Mains.....	$317,996
Investment for operation	185,000
Or a total of....	$502,996

or 12½ cents per 1,000 cubic feet annual sales.

It is also important to note that the present installations, both as regards high pressure mains and machinery, will have a capacity of almost double our present needs when certain few extensions which are contemplated will have been completed. Summarizing the advantages and disadvantages obtained by the St. Louis method of distribution we have:

Advantages.

1. The investment needed to change the existing low pressure system of distribution to the manhole system may be as gradual as desired, by extending the belt line only as needed.

2. Advantage can be taken of existing low pressure mains, and also of present pumping lines between the works and holders by making them a part of the future belt line.

3. The belt line having been once installed, any low pressure district can be reinforced, either by installing a manhole on the belt line, if the low pressure district happens to be contiguous with the belt line, or a branch or separate main can be run from the belt line to the center of the low pressure district and a manhole installed at comparatively small expense.

4. The total investment is decidedly very much less for this system than for any other system contemplating low pressure trunk lines and holders.

5. The storage capacity can be grouped at central stations, resulting in greater economy than where the holders are installed at various points throughout the city.

6. Complaints of low pressure are absolutely done away with.

7. The pressure being automatically regulated, sudden fluctuations in the load, such as, for instance, dark days or fogs, are taken care of. In St. Louis this frequently happens in the business sections of the city, while the balance of the city is still bright.

8. Advantage can be taken of the fact that different sections of the city frequently have their peak loads coming at different hours. For instance, the peak load in the manufacturing districts is not always coincident with the peak load in the better residential sections of the city. This peak load is taken care of automatically. If holders were installed the pressure regulation from the holders is only available for the particular vicinity supplied by that holder, whereas in the belt line system no greater capacity is needed to take care of the variation in the peak load in the different sections, as each district draws its gas from its local manhole, which in turn is supplied from the belt line.

9. Sparsely settled districts can be supplied directly from the belt line and the advantages of straight medium, high pressure distribution obtained.

10. It is possible to first supply distant territories through medium, high pressure mains, which can be converted to low pressure mains at a very small expense, should this prove desirable at some future date.

11. The holders, works and manholes, all being under the strictest control, advantage can be taken to fill holders in a very short time at the periods other than peak load by pumping from any works or pumping station to any holder.

12. The gas being very much drier than in the ordinary low pressure

distributing systems, the expense of pumping drips in the far outlying sections of the city is very much decreased. The record for the year's pumping for 1907 has already been given in this paper.

13. Exceptionally large consumers in the portion of the city near the high pressure lines can be taken care of with very small expense by utilizing the high pressure gas.

14. It is not necessary to pump against a maximum pressure of 5 pounds, except at small periods of peak loads. The average pressure pumped against in St. Louis for the past year is between 3 and 3½ pounds.

15. It is possible to locate the works at a considerable distance from the city, where property is of less value than at points near the city or inside the city.

16. The investment for holders can be decreased, or else postponed for a number of years.

Disadvantages.

1. The extra cost of pumping gas, including interest and depreciation on pumping machinery.

2. Slightly decreased candle power in the gas.

3. The operating cost of the manholes. In St. Louis 2 men take care of 15 manholes.

4. Owing to the fact that the pressure from the manholes is automatically regulated, it follows that, during the period of "No Load," as, for instance, during the night, the pressure throughout the district controlled by the manhole will gradually increase until it reaches the same pressure as that maintained in the manhole, therefore maintaining an unnecessary high pressure, which may, under certain circumstances, increase leakage. I do not consider this pressure a very serious disadvantage.

5. Greater danger in case of leaks on the high pressure lines.

(To be Continued.)

Tall Concrete Chimneys.

[Prepared for the JOURNAL, by "R."]

I notice that present-day engineers are building tall chimneys for gas works, as well as other manufacturing plants, from concrete blocks, on the plans exhibited in the accompanying illustrations. It is claimed that the expense of building the hollow-block, tall chimney is cheaper than when the stack is erected with brick. Fires are said to be averted, for the reason that as the blocks are made to match, they cannot be put up in such way that openings exist, as might be the case if a brick got out of place. Of course, there are several forms of the hollow-block chimneys, one style of which is constructed with common, hollow cement blocks, each block being of the same height, but smaller through. In other instances the blocks are large at the base of the stack, decreasing in thickness towards the top. The two different sorts of blocks are shown in Figs. 1 and 2.

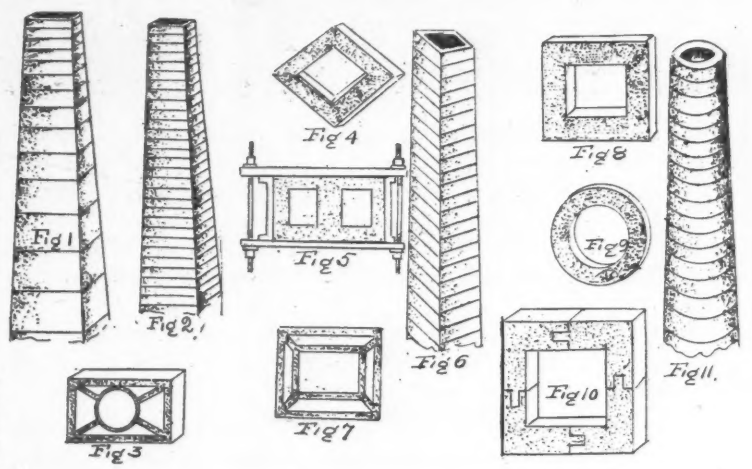
Then, again, some of the blocks are molded so that the opening is full and square. In other forms the opening is divided, as in Fig. 3. A number of different designs are made for the interior of the block.

Regular types of machines are made and sold for chimney block patterning and some of the works operate these machines, while in other works the blocks are shaped with home-made flasks, the construction of the blocks depending upon the character of the chimney desired. Perhaps the requirements demand a stack with diamond-shaped blocks, as in Figs. 4 to 6. Or perhaps the blocks are to be molded with double apertures, as in Fig. 5. Then, again, there is the combination block, as in Fig. 7. There are forms of blocks with double and even triple walls. The joints have to be made so that the wall formation will be maintained from top to bottom in the stack. This can be done by using the same mold for the blocks, or molds of the same gauge.

The first thing to do in the formation of the blocks, however, is to get the material made up and in readiness for service. The concrete for the chimney blocks can be made of one part Portland cement and three parts sand. Get clean sand, sift it, and see that it is characterized by sharp points on the grains, as these points form quite an important item in fastening the potent parts of the cement in combination with the other ingredients. Then add just enough water to make a spongy mass—you do not want sloppy mud, nor can your mix be too stiff to handle. Get the mix so that it can be packed readily in the molds. Secure a good tamping device and pack with that. After you pack a block let it remain in the mold long enough to set well; further it is a good idea to have some extra molds so as not to crowd a single one. After the block is removed from the mold it should be granted 2 or 3 weeks to season. This latter is important, for I have been told of cases of deflected stacks due to the settling of improperly seasoned blocks. The blocks can be painted over with preserving material, raw oil being used by some. Sometimes wires are passed through the blocks for strengthening purposes.

Fig. 5 shows one of the casting molds. The sides are made of hardwood, and the bottom is of planking, smooth and hard. Great care should be taken to get the mold perfectly square at the edges, as any deflection there from the square will show in all of the blocks. Considerable time and pains should be given to the getting out of the stock for the mold and the parts should be joined as carefully as possible. The fastening bolts for the sides are simply rods, with threads cut on same, and nuts with washers for tightening up.

While many of the hollow blocks are cast with a square hole, as in Fig. 8, some are made with a round hole and square outside, or with a round hole and round exterior, as in Fig. 9. The round stack is shown in Fig. 11. Again, blocks are constructed as in Fig. 10, with projecting tongues in the quarter sections, these tongues fitting into grooves molded in the intersections. The blocks thus made are usually for quite large stacks, where it would be difficult to mold a block in one piece of ample proportions for the complete stack. The sections are made separately and joined when finished.



Fitting Wagons in Service, Spokane Falls.

We are indebted to Mr. E. H. Gimper, General Manager of the Spokane Falls (Wash.) Gas Light Company, for the following facts in connection with the fitting wagons' service of that Company:

Owing to their compactness we thought that perhaps some mention of the fitting wagons recently put in service by our Company would interest some of your readers.

The wagon, which is manufactured by the Studebaker Company, is the heaviest of that concern's well-known light delivery wagons, being a 3-spring wagon with box 9 feet long by 4 feet wide with 1¼-inch tires on the wheels. To or on the right-hand side of the wagon is a meter box that is carried on the outside of the wagon box, over the wheels, by a steel frame at each end. Between box and frame are 4 spiral springs, which permit a horizontal as well as a vertical motion of the box and relieve the meters carried in the box from excessive jarring. The box is partitioned off, each partition being thoroughly padded, and so spaced that provision is made for 3, 5, 10 and 20-light meters. Wide strips of canvass are buckled over each meter to keep it in place.

On the left hand side of the wagon are two pipe hooks, provided with straps for the carrying of pipe. These hooks project on the outside of the wagon box and inside the wheels. All pipe before being loaded on the wagon is cut into half lengths.

To the inside of the wagon box, on the floor and against one side, is a long, narrow box, fitted with suitable compartments for carrying fittings. Under the seat of the wagon is a box for the fitters' tools, alongside of which is what we term a "return fitting box," the fitter being required to put all fittings removed in making repairs on a job in this box, which are then returned to the storeroom. At the rear of the wagon fastened to the bottom of the bed, is a suitable pipe vise. This leaves sufficient room for loading 3 of the ordinary 18-inch ranges, space also being found for a street key and service pump, for cleaning services.

At the rear of the driver's seat, tightly folded up and strapped in place, is a heavy, waterproof duck cover, which, during stormy weather, is unfastened and thrown over the entire length of the bed of the wagon. This cover is cut 2 feet wider than the width of the wagon box at the driver's seat, and 4 feet at the rear, which keeps the bed of the wagon and the material thoroughly protected from any storms.

The horse (jet black in color) hitched to the center wagon was recently entered in the Spokane Horse Show, and received the second prize in the light delivery class.

New Business Policies.

[A paper prepared by Mr. H. C. Hill, Manager, La Porte, (Ind.) Gas Light Company, for the Grand Rapids Convention of the General Managers of Messrs. Child, Hulswit & Co.]

Convenience and cleanliness are the best arguments the gas man has for the use of gas, bnt to substantiate this claim there must be continuous good service, consisting of even pressure and a regular supply of good quality gas.

Regularity is the most important feature, as varying candle power, heat units or pressure are noticeable and invite adverse criticism, ordinary comprehension, grasping and questioning what would be embarrassing and eventually expensive to explain, in the way of varying bills, more or less time to cook a meal, with one time a good light and at another time a poor one. The resulting complaints may well deter the inexperienced from attempting the use of gas, and the testimony of our present consumers brings our new business regardless of whatever other methods or the quantity or quality of advertising me may use, these latter only suggesting inquiry and investigation of our claims for the use of gas for various purposes.

Clean gas is absolutely necessary, not only to prevent, as much as possible, the discoloration of ceilings, fixtures, etc., but also to prolong the life of the meters, to avoid rusting the services and house lines, making necessary frequent cleaning of lamps and burner pilot tubes and as well of all appliances and their readjustment; all of which make impossible any regularity of service and cause great inconvenience and dissatisfaction, counteracting the hardest work and best methods on the part of your new business departments.

The cost or expense of using gas is a secondary consideration, where good service is maintained, for practically every movement against a gas company the country over can be traced directly to poor service. In nearly every community the majority of people will agree that service beyond criticism is worth more than that which is not to be depended on and an inferior quality of gas is furnished. But irregular service must necessarily be furnished at a much less price than good gas at even pressures, as it will require a greater quantity of poor gas at irregular pressure to produce like results.

For a paper on "New Business Policies" this may appear as being far more along the lines of manufacturing and distribution, but in a great many plants the fact that quality of service is our best new business policy is entirely lost sight of. And it is not putting it too strong to say that no plant is above criticism on quality of service, and in very many the comparison between the service given and the methods and expense of securing new business is out of all proportion. The new business department is at the mercy of all others, since no one wants poor service at any price, while good service makes our product a necessity for all. Then new business comes of itself, a suggestion or information given so as to receive consideration by one who can use our service resulting eventually in securing new business.

It is not to be expected that there will never be any complaints, but by educating consumers to report promptly any irregularities of service and then giving same prompt attention, the complaints received may be turned to our credit rather than be held a detriment. From rather limited experience our observation has been that there is a direct comparison between operating costs in all departments, new business gains, and quality of service; low operating costs and large new business gains indicating good service. A plant may be operating at low cost at the expense of the service, but in the end rapid depreciation and public agitation will eat up several times over any saving which may have been made in giving poor service, these items being chargeable to operating cost, and we, therefore, refer to continuous low operating costs covering a term of years.

Particularly during the past year our experience has been that the more of the luxuries of life a person can afford, the more he expects, asks and demands from the gas company. And proportionate with what may be given them in the way of free connections or free maintenance so do they estimate (and not without good, sound reasons) the supposedly exorbitant profits made by every gas company, a belief inherited by at least the later generations of American people. The word "free" has been the cause of much agitation against gas companies, and it should be eliminated from the vocabulary of every gas company employee. Public sentiment has much to do with our new business gains, as the average citizen hesitates to use anything for which charges are claimed to be exorbitant. If we have anything to give, it should be by a reduction in the price of gas, thereby encouraging and making possible an increased use of gas by present consumers with present connections and without additional distribution investment on our part, rather than by doing free piping for new consumers beyond the curb line. At least where the increased sales are not proportionate to the expenditure, a portion of the cost must be borne by older consumers through their being obliged to pay a higher rate for gas than might be possible with less gratuitous work.

Where consumers pay for just what they get it is also possible to run mains into territory not otherwise profitable, and the investment being less, as the small consumer is less of an expense, there is a possibility of coming out even, at least.

Charging cost for services from curb to meter may possibly result in a less number of new services than would be the case if no charge were made, but to offset this there is, in the case of the property owning consumers, the acquisition of much more reasonable consumers from the fact of their investment, as well as their desire to get some return for their money, this to be had only by using the gas for all purposes possible, and this we have found the case in nearly all instances. As yet the charge for service has not prevented our securing a consumer. Good service compels property owners to put gas in tenant houses eventually, as most renters desire gas for light and fuel, for the reason that their investment is much less, the appliances are simple and easy to move, and there is no stock of coal or other fuel to move or bother with in any way.

Appliances furnished to consumers have much to do with the satisfactory and economical use of gas, and results should be considered instead of first cost, regardless of what consumers may desire to pay, as the results obtained are never at first considered in comparison to the cost of an appliance. For instance, department stores and 5 and 10-cent stores handle cheap grades of glassware and mantles, but eventually the consumer distinguishes between the results obtained from their supplies and decides in favor of gas company supplies. If ours are unsatisfac tory, naturally they condemn the gas, therefore, the necessity for our supplying only the best quality appliances, etc.

The new American inverted arc lamp is practical in construction and should work satisfactorily with most gases, particularly as it admits of a much wider range in pressure than the first lamp or any other lamp of this style so far put on the market. The Welsbach Reflexolier just put on the market is practical, and its appearance and operation, first cost and maintenance make it a very valuable a ppliance to replace the Tungsten installations. The Welsbach Reflex system of window lighting, described in a recent "Bulletin" of the Welsbach Company, is very successful, and a window completed the past week on one side of a clothing store has caused considerable

comment by the public from reason of the sharp contrast with an electric lighted window on the other half of the same store. Our consumer is delighted with the result and desires the other window so equipped immediately, as the light is very much better distributed, of a better quality, and greater candle power at a much less cost per candle power. The installation being equipped with a simple time device, the lights can be put out automatically at any time they may care to set. As we have a considerable investment in upright arc lamps, we are obliged to sell the new inverted arcs to the consumer. This we are doing on the basis of $1 per month for 12 months, the lamps to be maintained during that time and become the property of the consumer at the end of that time. We are also making the same proposition on the Welsbach Reflexolier proportionate to the number of lights per fixture. We have quite a number of inside and outside Humphrey upright arc lamps in use in factories and stores, and these we have been maintaining at 25 cents per month, and had they been installed originally at 50 cents per month, we could easily charge that amount and have the consumer satisfied where same are kept in good condition.

For all new piping or for changing the location of present piping or of the motors we have charged practically cost and have no difficulty in collecting same. In the selling price of a new range is included the cost of stove line as well as a line for one light at the range, including a 1-swing bracket and Welsbach burner complete, for which no reduction is made if not taken, as this one light has been the means of securing the lighting of a great many houses after the range was installed. On all ranges, fixtures, burners, piping, appliances, etc., we allow a discount of 10 per cent. on the amount of the first payment, whether for the whole bill or only part, which helps our collections very materially.

Tailors' gas irons are much cheaper to operate than the electric irons, and we have quite a number of them in use, the gas consumption in which is a considerable amount each month. The household iron is a very good new business appliance, as it creates a desire for gas in the house and cannot be used very handily in a house not piped to light with gas. The temperature of the gas iron can be absolutely controlled, and is, therefore, more satisfactory than with any other method of heating an iron.

Our newspaper advertising has been most effective, and this we believe is more effective where persistent and continued the year round, varying the form, and not only calling attention to the various purposes for which gas may be used, but also instructing in the use of gas and the working and reading of the gas meter, as the better informed the public become regarding these matters the more reasonable will be their complaints, which must have a wholesome effect on prospective consumers.

A personal canvass by a solicitor has been of great assistance in securing new business, and we have endeavored to make such calls timely and welcome, rather than objectionable, by means of distributing novelties, such as pencils, aluminum thimbles, advertising soap, needle cases, matches, yard sticks, pocket memo. books, etc., which are all inexpensive, and some of which may be obtained from the various appliance manufacturers. We have also endeavored to run attractive advertisements on the backs of our gas bills each month, and have also advertised gas irons, toasters, lights, etc., by means of stickers attached to the fronts of the bills, most of which have been furnished by the manufacturers of these appliances.

Some time ago we ran, as an advertisement, filling one column, the cuts and reading matter contained in the Welsbach Company's circular, "When the Mantle Blackens," which attracted considerable attention to gas lighting, and to the care of same to obtain the best results, which, in comparison with any other form of lighting, will insure the use of gas and so much additional new business, where, with a dirty, poorly adjusted light, the blame would be laid on the gas and no attempt made to use the gas light.

In none of our advertising have we attempted the comic. There have been some very notable failures in this kind of advertising, and a dignified appearance in the public eye and mind leaves, we believe, a much better impression and feeling toward the company. "Knocking" does no one any good, and business obtained by this means is not worth having, for it is usually the source of more or less complaint. Calling attention to the faulty service of others only encourages their pointing out our own faults, and we are, therefore, very careful not to go beyond comparisons of cost and candle power in soliciting new business, and never to mention any particular form of competition in our advertising matter. We can gain more by legitimate advertising and by holding the respect of our competitors than we can by attempting questionable methods of getting new business.

During the county fair in our city last month we had the central exhibit in the main exhibition building, having a booth decorated in black and yellow with "Cook with Gas" posters around the railing and up-and-down the supports for the ceiling of the booth. In the booth we had a complete display of gas appliances, and with a large number of upright and inverted lights burning, made the booth as near as possible a blaze of light. All of the gas used in the booth passed through a meter with a glass front, top and top of valve box, connected up on the counter in plain view of everyone. To interested parties we gave the Maryland Meter Company's booklet, "The Trouble with Jones," a copy of which we had previously placed in the hands of each of our consumers. Our booth gained the name of "The Cook with Gas Booth," and we received several very favorable write-ups on same by the newspapers, and the Fair Association people were highly pleased at the display we made. As we have received a large number of inquiries since the Fair regarding various appliances which were exhibited there, we feel well repaid for the time and expense of making the display.

In our solicitors' work we are preparing a card index of all buildings in the city, these cards containing information as to service, number of meters, what is used for light, cooking or fuel, name of occupant, name of owner, the possibilities of putting gas in if not already in, and where in use, the prospects of further use for other purposes. These cards are filed for future periodical calls, or for any data which may be requested by the prospective consumer. The business conditions the past year have made new business somewhat slow, but so far we have every reason to be well satisfied with that which came our way.

The Gas Company and the Public.

[A paper prepared by MR. E. M. WALKER, Manager, Citizens Railway and Light Company, Muscatine, Ia., at the Grand Rapids Convention of the Managers of the Messrs. Child-Hulswit Companies.]

The subject assigned me for treatment is one which suggests to the minds of most of us gas men fully as much as could be gotten in so few words. For when you say the "Gas Company and the Public" you name inclusively the entire *dramatis personae* of every successful gas undertaking. I assume that the intention, in giving me this subject for discussion, was that the subject should be treated in the specific sense of the ideal relations between the gas company and the public, and how best to secure these ideal relations. It is true that many undertakings suffer on account of the lack of confidence or loyalty between the company and the public, and no less true is it that, largely on account of the good feeling, loyalty and trust, many gas companies are unusually successful.

Gas managers are in charge of enterprises which, by their very nature, are monopolistic; that is to say, are best conducted by one concern, for the reason that the business of supplying gas can usually be carried on upon so large a scale with reference to a given community, as to render impossible the true economic applications of competition. Therefore, these enterprises are best treated as public functions, and should be in the hands of those who will best administer them for the use and convenience of the public wishing to be their patrons. This idea was first promulgated by John Stuart Mill, whose thought only, and not his exact words, I have been able to reproduce.

Having established the opinion that the ideal relations between the gas company and the public are those of trust, confidence and loyalty on the part of the public, and of devotion, interest and desire to serve on the part of the gas company, let us see how the gas manager must strive to attain these much to be desired ideal relations.

Admissions must be made on both sides. First, on the part of the company that is in the business for profit; and second, on the part of the public, its patrons, that they are desirous of obtaining the most light, heat or power that they may be able to procure for a given unit of value. These admissions made, then, with both sides having a willingness on the part of each to allow the other to secure and to do all in its power to allow the other to secure its desires, ideal relations must of necessity follow. The public is only interested in one thing, and that is in securing "light for a price." The gas company is only interested in the converse of the same proposition, which is in satisfying the public with good, in fact the best, light, at the best possible price, which can only result from the highest degree of satisfaction to its patrons, with the best possible degree of profit to itself. In the foregoing I have used the term light, whereas I might perhaps, with more point, have used energy; for we are strictly purveyors of energy, whether in the form of light, heat or power.

In striving to bring about these ideal relations as between the gas company and the public, the gas manager, especially he whose call to duty places him in charge of an operation situated in a small or medium sized town or city, will find he has three elements to satisfy —*i. e.*, the local town or city government, in which is vested police power over his deportment, or rather the deportment of his company, the consuming public and himself, this last term being used inclusively as meaning his board of directors and the owners of his company as well as himself.

In dealing with the local governing board, by whatever name it may be called, let his every act inspire confidence and the wish to do all that is required under his franchise, to do it faithfully and well; let him also attend carefully to every criticism that may be made in reference to his company's operations, giving it due consideration and attention. Above all, do not seek to place yourself under obligations to the governing board by trying to secure an advantage to which in the eyes of the public, you are not entitled. Let your patrons know:

(1) That any just complaint of poor service will be promptly attended to at no expense to them.

(2) Frankly, that you are in business to give them the most you can for the money, and also, if possible, by doing the above, to make a profit for your stockholders; but impress upon them the fact that you are not willing to do the latter if you cannot at the same time do the former, neither do your stockholders wish it.

(3) That you are just as vitally interested in their securing as much "Energy for a price" as they are.

(4) That your ability to successfully trade with them is correlative with their ability to trade with you; in short, you must ask them to meet you on a purely commercial basis.

(5) That you not only want, but deserve, their confidence.

The above rules have been successfully followed in no less than 3 different places, in 3 different parts of this country, quite remote from each other, and I surmise that an expression was asked from the writer on this paper for the reason that relations were rather strained as between the city council, the public and the operating company, at the time he took charge of his present station.

At that time there had recently been threatened an annulment of franchise. Quite a hostile feeling existed between the company and its patrons, and there was before the city council a proposed ordinance reducing the price of gas to 60 per cent. of its lowest profitable marketable price.

As a result of a careful adherence to the above outlined policy, the first has been long since forgotten, the last has been laid on the table, and the company numbers as friends as many as have its meters installed, and then some, if we may judge by the fact that the number is increasing from day to day.

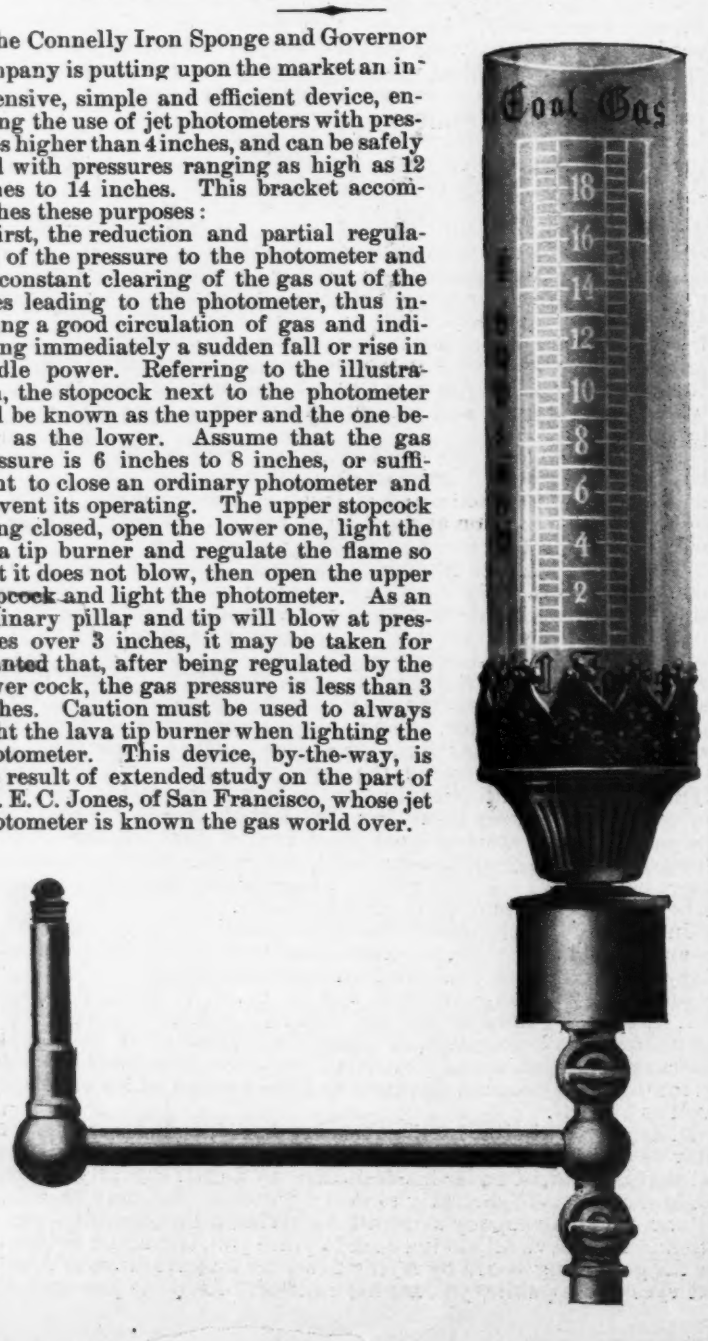
To conclude briefly. The elements which conduce to the ideal relations as between the gas company and the public, are:

(1) Confidence on the part of the public.
(2) Good service on the part of the company.
(3) Trustworthiness on the part of the one in charge of the operation of the company.

The Jones Pressure Reducing Bracket.

The Connelly Iron Sponge and Governor Company is putting upon the market an inexpensive, simple and efficient device, enabling the use of jet photometers with pressures higher than 4 inches, and can be safely used with pressures ranging as high as 12 inches to 14 inches. This bracket accomplishes these purposes:

First, the reduction and partial regulation of the pressure to the photometer and the constant clearing of the gas out of the pipes leading to the photometer, thus insuring a good circulation of gas and indicating immediately a sudden fall or rise in candle power. Referring to the illustration, the stopcock next to the photometer will be known as the upper and the one below as the lower. Assume that the gas pressure is 6 inches to 8 inches, or sufficient to close an ordinary photometer and prevent its operating. The upper stopcock being closed, open the lower one, light the lava tip burner and regulate the flame so that it does not blow, then open the upper stopcock and light the photometer. As an ordinary pillar and tip will blow at pressures over 3 inches, it may be taken for granted that, after being regulated by the lower cock, the gas pressure is less than 3 inches. Caution must be used to always light the lava tip burner when lighting the photometer. This device, by-the-way, is the result of extended study on the part of Mr. E. C. Jones, of San Francisco, whose jet photometer is known the gas world over.



Items of Interest
FROM VARIOUS LOCALITIES.

On and after the 1st proximo the selling rate at Waltham, Mass., will be reduced to $1 per 1,000 cubic feet. This fulfills the schedule agreement entered into between the Company and the authorities in 1905, under which the rate was to be reduced 5 cents per 1,000 each year, until the announced figure for 1909 was reached.

We understand that a syndicate of local business men proposes to erect and operate a modern gas plant in Fort Atkinson, Wis., the corporation to be known as the Fort Atkinson Gas Company. The syndicate estimates that an initial expenditure of $60,000 will be required under the plans proposed.

At a meeting of the Mount Vernon (Ind.) Council, held early this month, the gas franchise granted to Messrs. John G. Hester, Fred. H. Goodrich and John W. Turner, under which they were authorized to construct and operate a gas works in Mount Vernon, Ind., was extended, as to its lapsing time, for a period of 6 months. The charter of the Company is for 25 years, and the amount of its capital is fixed at $100,000. The stringency in the money market delayed the proposed construction; but it is quite certain the scheme will be put into operative effect during the ensuing year.

The Glassboro, Pitman and Clayton Gas Company, of Pitman, N. J., is now laying the pipe line necessary to connect the outlying settlement of Newfield with its distributing system.

The holdings of the late Senator T. E. Lee in the Carroltown (Pa.) Gas Company have been purchased by the syndicate which proposes to secure franchises for the manufacture and distribution of gas in the contiguous towns of Edensburg, Hastings, Patton, Carroll, Spangler and Barnesboro, Pa.

"L. V. M.," writing from Springfield, Mass., says: "Mr. Charles Ennis, who recently resigned his position as Superintendent of the Worcester County (Mass.) Gas Company, in order to accept a responsible situation in Boston, was given a surprise in Memorial Hall, Warren, Mass., early this month. He was summoned to the Hall, on the suggestion that something was wrong with the gas supply. He was quite nonplussed when on his arrival he found about 50 of his friends from Warren, Brookfield, Spencer and Palmer, gathered around the hotel's banquetting hall. Before his wonder had abated he was escorted to the head of the table. The appetites of all having been well appeased, and the cigars having been set to puffiing, Mr. James F. Hill, who had the direction of affairs, arose, and in his attention-holding way spoke a pretty piece, at the conclusion of which he handed to the blushing Ennis, a gold watch chain and charm, a third appendage thereto being a $5 gold piece. So now Ennis will have money wherever he goes. I would report a few of his 'well chosen' words, only I fear they would not pass without emendation the editorial scrutiny; even the tip of the terrible blue pencil might be brought into play. There was no doubt however, that he meant what he said, or that he fully appreciated the sentiments that were behind the gifts. That he will succeed mightily in his new field is the hope of his many friends and the positive belief of his intimates."

Mr. Fred. Lynch has been appointed Manager of the Alden and Batavia (N. Y.) Gas Company.

A special meeting of the shareholders in the Utah Gas and Coke Company, of Salt Lake City, will be held in Salt Lake the afternoon of the 23d inst., for the purpose of determining whether the capital stock will be increased to $3,000,000, and to classify the stock, making the new stock of the preferred class, etc.

Mr. Ellery G. Willard, who for the past 3 years has served as Chief Clerk for the Fulton County Gas and Electric Company in its Gloversville (N. Y.) office, has resigned that position. He will engage in business on his own account.

According to Mr. Arthur G. Everett, Building Commissioner of Boston, Mass., in a communication to Mayor Hibbard of that city, such communication having been forwarded by the Commissioner as the result of a speech made some time ago before the City Club, of New York, by Mr. James L. Richards, President of the Boston Consolidated Gas Company, the maintenance cost of the gas inspection

division of the Building Commissioner's department was $17,800 per annum, 80 per cent. of which was absorbed by salaries. The Commissioner further remarked: "I believe that the city should not be at the charge of inspecting gasfitting, where this work can be done as efficiently by the gas company. The gas company is directly interested in the installation of a system of piping which shall be adequate to supply its product. The gas company is also interested in securing safe distribution that its product may be used without danger. The gas company now refuses to turn on the gas until a certificate is received from this department stating that the piping is adequate and tight. The responsibility for the condition of the piping is assumed by the city rather than by the company, which is at no charge for the expense of inspection and testing. As an adequate and safe system of gasfitting encourages the use of gas, it seems to me that the company supplying it is the party interested, and that the charge for inspection should be borne by it rather than by the city."

MR. S. E. C. YOUNG, one of the wealthiest citizens of New Jersey, and well known to the gas fraternity of this section through his large holdings in the Hudson County (N. J.) Gas Company and of the Public Service Corporation of New Jersey, died at his home in Jersey City, the afternoon of the 6th inst. He was in his 74th year, having been born in Morristown, N. J., January 27, 1835. He is survived by his widow, one daughter and one son.

MR. JAMES E. MURDOCK, Assistant to President Dieterich, of the Logansport and Wabash (Ind.) Valley Gas Company, and prominently identified in the recent movement which resulted in the formation of the Indiana Lighting Company, died very suddenly the afternoon of the 25th ult. Perhaps no other man was better known in connection with the natural gas trading in Ohio and Indiana than Mr. Murdock, and the like statement could be truthfully made regarding the banking interests of the States named.

MR. MIRON S. NATHAN has resigned the position of Assistant Cashier to the Sacramento (Cal.) Electric, Gas and Railway Company. The day of his leaving its service was selected by many of his associates to present him with a handsome gold watch fob set with small diamonds, to tell him of their regard for him and to express the wish that good fortune would be his portion wherever his lot might be.

THE Portland (Ore.) Gas Company this month decided to completely get out of the gas fixture and gas appliance business, and to hereafter confine itself strictly to the sale of gas. Mr. W. M. Kapus, who has for some years been purchasing agent for the Company, and Mr. R. Michler, who has acted as credit man for the Company since 1898, have taken over its appliance trading, and to go into the same properly and understandingly have organized the Northwest Gas Equipment Company, with headquarters in Portland. The new concern will devote itself to the conducting of general engineering and manufacturing operations, and will maintain a series of exclusive agencies. So far it will act as the exclusive agent for the New York Improved Meter Company for the entire Pacific Coast; the Ruud Manufacturing Company, for the States of Oregon, Washington, Idaho, Montana and British Columbia; the Wm. M. Crane Company, of New York, for the entire Pacific Coast; and The Gas Machinery Company, of Cleveland, for the entire Coast. The Company will maintain a large and modern display room in Portland, and the same will be open for business January 1st. The officers elected are: President, R. McC. Michler; Vice-President and General Manager, E. H. Corbett; Secretary and Treasurer, W. M. Kapus. The Company has already received and is carrying in stock carloads of ranges, heaters, etc., and the General Manager informs us that it will speedily be in position to furnish the gas industry of the Pacific Coast with almost anything required directly out of stock. It is proposed to maintain a traveling force to cover intelligently all points on the Coast where gas is distributed.

MR. F. N. ABBOTT, who has been Manager of the gas plant at St. Johnsbury, Vt., since its completion, has resigned. He goes to Temple, Tex., to construct the gas works there that has been arranged for by Mr. J. R. Dawson, of Boston. His successor at St. Johnsbury, as noted before in the JOURNAL, is Mr. George Bud.

THE showing made in the report of Superintendent Blakeslee, of the Bureau of Gas and Electricity, for Utica, N. Y., for last month, is especially discouraging to the yawpers against the "rapacity," etc., of the local gas concern. During the month noted 462 gas meters were examined—two of these were tried out on consumers' complaint. The result was both were found slow—2.5 per cent. and 5 per cent., respectively. Of the balance, 323 were shown to register accurately; 30 were fast—average of 3½ per cent.; 84 were slow—4.05 per cent. average; and the balance was within the legal limit. During the month 4 tests were made on account of candle power—the required value is 21 candles—and these showed as follows: Nov. 5, 21. 5; Nov. 12, 22.4; Nov. 18, 21.8; Nov. 25, 22.3.

AT the special meeting of the shareholders in the Scranton (Pa.) Gas and Water Company, called for the 10th inst., the object of the meeting being to increase the indebtedness of the Company to a sum of $4,000,000, the necessary consent was given.

MR. JAMES W. HARBAUGH, of Toledo, O., has been appointed receiver for the lighting properties operated under the ways of the Consolidated Gas and Light Company, of Toledo. The plants concerned are: An electric lighting system in Tiffin, O., and gas works in Genoa and Delphos, O. The complainant is the Security Trust and Savings Bank, of Toledo.

THOMAS DAVIS, who was actively concerned in the erection of the gas plant that was built in 1871 for the purpose of supplying gas to the section, now known as the Hyde Park district of Chicago, died at his home, 581 Fifty-second street, Hyde Park, the evening ot the 11th inst. He was in his 77th year.

MESSRS. FRITCHMAN, Lemardin and Peed are proposing to construct and operate a gas works in Elizabeth City, Va.

THIS is given for what it is worth, under date of the 15th inst.: "The American Coal Products Company has sold its by-product coke oven interests conducted by its subsidiary Company, the United Coke and Gas Company, the buyer thereof being the Oberschlesische Cohewerke und Chemische Fabriken Aktien Gessellschaft, of Berlin. The transfer is to become effective the 1st prox. A new Company, to be called the German-American Coke and Gas Company, is to be formed to take over all the by-product coke oven patents heretofore exploited by the United Coke and Gas Company, including the Otto-Hoffman and United-Otto systems according to which more than half of the bye-product coke ovens in the United States have been erected. The succeeding Company is to be capitalized in $3,000,000, of which $500,000 is to be paid in cash at once, to be increased as occasion requires. The officers elected are: Chairman, W. H. Childs; President, Dr. F. Schniewind; Vice-President, A. Zindler; Secretary and Treasurer, F. Moser: Consulting Engineer, Wm. Altpeler. The American Coal Products Company will have a stock interest in the new corporation. The former was incorporated in New Jersey, February, 1903, and purchased all the stock of the United Coke and Gas Company, as well as nearly all of the stock of the Barrett Company. The authorized capital stock is $15,000,000, of which there is outstanding the sum of $10,284,000. Dividends of 5½ per cent. are declared annually. The Commercial Trust Company is transfer agent, and there are no bonds. We have often been asked about the personnel of the management of the American Coal Products Company, and we take this opportunity to here name them in full: Chairman, I. D. Fletcher; President, George W. Elkins, of Philadelphia; Vice-Presidents, W. H. Childs, New York, and Stephen Peabody, Boston; Treasurer, T. W. Weeks; Secretary, E. H. Kidder; Asst. Secy. and Asst. Treas., E. J. Steer. The Directors are: Eversley Childs, W. H. Childs, I. D. Fletcher, E. H. Kidder, Emerson McMillin, Stephen Peabody, T. M. Rianhard, F. Schniewind, H. S. Ehret, Michael Ehret, G. W. Elkins, Powell Stockhouse, G. D. Widener, S. H. Bingham, Wm. Flinn, P. S. Marquis, A. T. Perry, R. C. Pruyn, J. C. Runkle and E. H. Wardwell.

IN Italy, since August, 1895, a tax of 12 cents per 1,000 cubic feet has been levied on all gas distributed on private account. The tax does not apply to gas used for the lighting of public buildings, streets, parks, etc.

THE proprietors of the Pawtucket (R. I.) Gas Company, which to all intent and purpose are the members of the firm of Stone & Webster, of Boston, Mass., have authorized Col. Wm. McGregor—may his shadow never grow less—to enter into a contract with Messrs. Bartlett, Hayward & Co., of Baltimore, for the construction of a holder up to retaining 1,100,000 cubic feet. The holder is to rest in a steel tank, 125 feet 9 inches diameter, and 32 feet deep, and is to be of the 3-section type, thus distributed: First, 116 feet; second, 114 feet; third, 112 feet.

THE Western United Gas and Electric Company is following this practice in its division at Elgin, Ills.: Pipe and fixtures installed as follows:

4	openings,	one	2-light	fixture	and	three	1-light	fixtures	$10 00
4	"	two	2-	"	"	two	1-	"	11.00
5	"	two	2-	"	"	three	1-	"	12.50
6	"	two	2-	"	"	four	1-	"	15.00

This is surely a liberal proposal on piping and fixture account.

MR. BURTON SMART, as Treasurer of the Portland (Me.) Gas Light Company, was authorized some days ago to forward the following to the Treasurer of the Portland Firemen's Relief Association: "Inclosed we hand you our check for $100 as a slight expression of our thanks for the excellent work of the department at the recent fire at our works."

MR. HOMER HONEYWELL, Manager of the Lincoln (Neb.) Gas Company, has resigned from its service in order that he may be enabled to devote all of his time to other business interests which have developed rapidly within the last 3 years. Mr. Honeywell served the Lincoln Company faithfully and well in various capacities since 1890.

MR. WALTER L. BYRON, formerly in charge of the advertising division of the business of the Union Gas and Electric Company, of Cincinnati, O., has been chosen Manager of the advertising division of "The Atlanta Georgian."

WE uuderstand that Mr. Frank Cutshall, for several years Chief Clerk to the Manager of the Fort Wayne (Ind.) Gas Company, has been appointed Superintendent of the Indiana Lighting Company's plant at South Bend, Ind. "Frank" is a decidedly clever sort of man.

MR. A. F. BIGELOW, Superintendent of the Allentown (Pa.) Gas Company for over a score of years, resigned from its service in order to engage in business on his individual account.

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PROPRIETORS.

THOS. J. CUNNINGHAM,
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MONDAY, DECEMBER 21, 1908.

The Market for Gas Securities.

Quotations for Consolidated at 1 P.M. to-day (Friday) were 164½ to 164¾. This, too, in face of the fact that the general share market was quite uneven and inclined to the low side. There can be no doubt it is a purchase for a noteworthy and speedy gain.

Massachusetts gas reflects in strength the purchase of the Richardson properties, and the bears are unable to drive Peoples, of Chicago, under par. The Denver Gas and Electric Company has declared a dividend of 50 cents per share, payable the first prox. Secretary Stannard, when interviewed in Chicago a week or so ago by the writer (the former did not recognize the latter), in being asked where Denver G. & E. was going to in price, answered: "Hard to tell; but up." The U. G. I. Co.'s regular dividend is payable the 31st inst. Keep your eyes on these shares.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

DECEMBER 21.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated Gas Co.	$73,177,000	100	164½	164¾
Central Union Gas Co.—				
1st 5's, due 1972, J. & J.	3,000,000	1,000	98	101
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	3,500,000	100	130	160
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	102½	103
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	100	101
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	100	105
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	86	91
Standard	5,000,000	100	70	100
Preferred	5,000,000	100	100	125
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	146	148
1st Con. 5's, due 1948, M. & N.	15,000,000	—	91½	92
Yonkers	299,650	509	130	—
Out-of Town Companies.				
Bay State	50,000,000	50	1½	1¾
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	509,000	1,000	95	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	63	66
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,000,000	1,000	104	106½
Cincinnati Gas and Electric Co.	29,500,000	100	89¼	8[illegible]¾
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	92	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90½	91
Preferred	3,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	—	105
Mortgages, 6's	3,600,000	—	—	118
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	—	—	74½	75
Detroit City Gas Co	5,000,000	50	—	50
" Prior Lien 5's	4,619,000	1,000	97	100½
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	103	103½
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	86
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis.	10,000,000	100	—	100
Preferred	2,500,000	100	60	90
Bonds	10,000,000	1,000	104	104½
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	350,000	1,000	105	108¾
" 6 per cent. scrip, due 1910	100,000	25	60	60½
Massachusetts Gas Companies, of Boston	25,000,000	100	56½	56¾
Preferred	25,000,000	100	86	87
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	100	100½
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104½	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	751,000	1,000	92	—
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgages, 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	96¼	—
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	102	—
Washington (D. C.) Gas Co.	2,600,000	20	337½	347½
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	230	—

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R. D. Wood & Co., Philadelphia, Pa....1094
Stacey Mfg. Co., Cincinnati, O....1095
The United Gas Improvement Co., Philadelphia, Pa...1087
Western Gas Construction Co., Fort Wayne, Ind....1100

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DIVIDEND NOTICE.

OFFICE OF THE UNITED GAS IMPROVEMENT CO.,
N. W. CORNER BROAD AND ARCH STS.,
PHILADELPHIA, PA., Dec. 9, 1908.

The Directors have this day declared a quarterly dividend of 2 per cent. (one dollar per share), payable Jan. 15th, 1909, to stockholders of record at the close of business, Dec. 31, 1908. Checks will be mailed.

1749-5 LEWIS LILLIE, Treasurer.

Position Wanted
As Superintendent or Manager of Gas or Electric Light Plant, or Both.

Graduate of Cornell University in mechanical and electrical engineering. Actively employed in combination company since 1903. References from leading engineers and managers and others familiar with my work and results. Open for employment after Jan. 1, 1909.

1749-tf Address, "A. B. C.," care this Journal.

WANTED, A BROADER OPPORTUNITY.

I am a heavy stockholder and manager, with excellent record, of one of the best, 675-consumer water gas plants in the Middle-West. Also, recently designed complete plant and supervised construction of works in city of 8,000, which is acknowledged by all, including one of the best gas engineers in the United States, as best plant of its class in this section. I enjoy the complete confidence of my associates, and have entire business and technical management of my company. Am married; am 30 years old, and began at the bottom. I want an interest and management of company in a city of 20,000 to 40,000, where results are desired and appreciated.

1748-4 Address, "ENGINEER," care this Journal.

WANTED,
A Position as Superintendent or Manager.

Five years' experience in constructing gas and electric properties. Three years' experience as superintendent of manufacture and distribution of gas. Prefer superintendent or manager of a gas property sending out 500,000 cubic feet per day or more. Can refer to present employers, and am open for employment after Jan. 1, 1909, or earlier if required. Address, "B—X.,"

1748-3 Care this Journal.

WANTED,
Gas Meter Repairers.
Must be experienced.

1749-2 Address, - "BOX 100," care this Journal.

FOR SALE,
One Pair 8 x 10 x 5 Dry Lute Purifying Boxes.

Steel, with center seals and connections and duplex hoist. CALUMET GAS CO.,

1741-tf LAURIUM, MICH.

SCHREIBER OIL SPRAY

DOES IT
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RIGHT WAY.
A PERFECT OIL
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ALSO THE SCHREIBER
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Utilize Your Gas Liquor.
NO EXTRA LABOR OR OPERATING EXPENSES.

IMPROVED AMMONIA CONCENTRATOR.

About 100 in use. Write to
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Modern Machine Shop Construction, Equipment and Management, by OSCAR E. PERRIGO, M.E.

Price, $5. For Sale by

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Of all the gas exhibits to be made in Chicago this December none will be more impressive and inspiring than the

70,000 HUMPHREY GAS ARC LAMPS

in regular commercial use. Good gas, good lamps, good service, will always win. :: :: :: :: :: ::

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We Manufacture Electrical Thermometric Instruments for all departments of Gas Making.

Fery Pyrometers.

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Resistance Thermometers.

THE FERY RADIATION PYROMETER IN USE.

Described in Booklet A-4001, Sent on Request.

A Model Meter House—No. 1.

View in the Meter Room of the North Shore Gas Co.,

WAUKEGAN, ILL.

In January, 1907, the above company installed a Rotary Meter of 60,000 cubic feet capacity per hour.

In September, 1908, a second Rotary Meter of 45,000 cubic feet capacity per hour was installed.

These meters are shown in the above illustration.

The arrangement as shown by the above view will commend itself to Gas Engineers and Managers.

Probably you have some such plan in contemplation. If so, we shall be glad to give you the benefit of our experience.

ROTARY METER COMPANY

One-half the cost—One-tenth the space of old style wet meters.

When in need of Station Meters, write

ROTARY METER COMPANY,

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Send for Catalog.

P. PLANTINGA, President W. E. STEINWEDELL, Secretary

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Main Office and Shops

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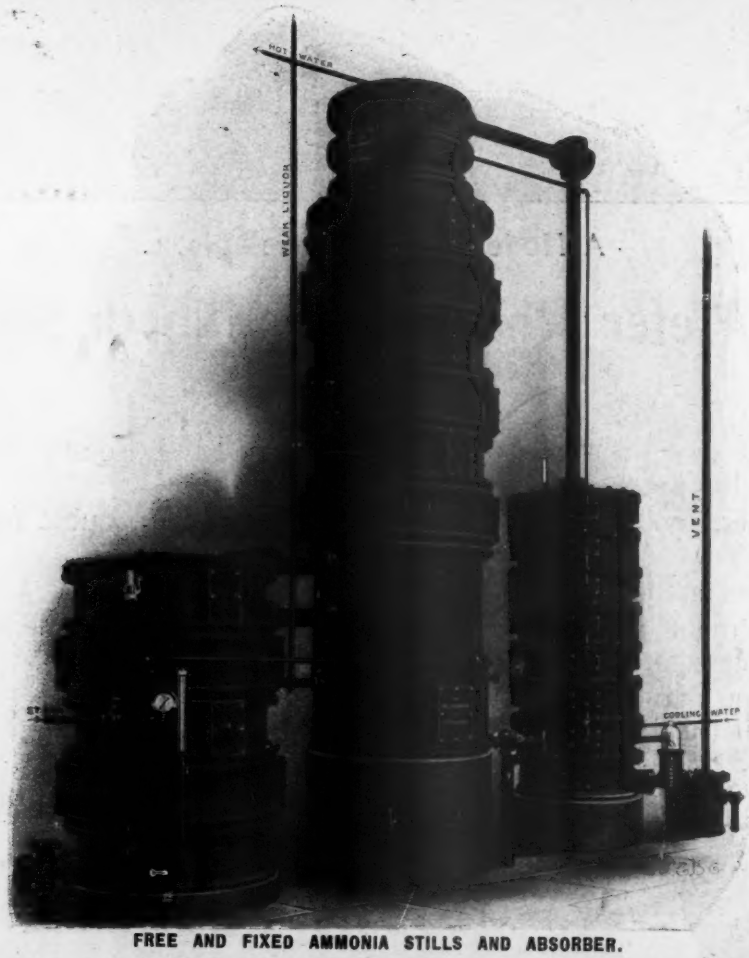
TAR EXTRACTORS, WASHERS, PURIFIERS,
VALVES, CONNECTIONS,
BY PRODUCT MACHINERY,
COMPLETE GAS PLANTS.



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WORKS:
Keasbey, Perth Amboy, N. J.

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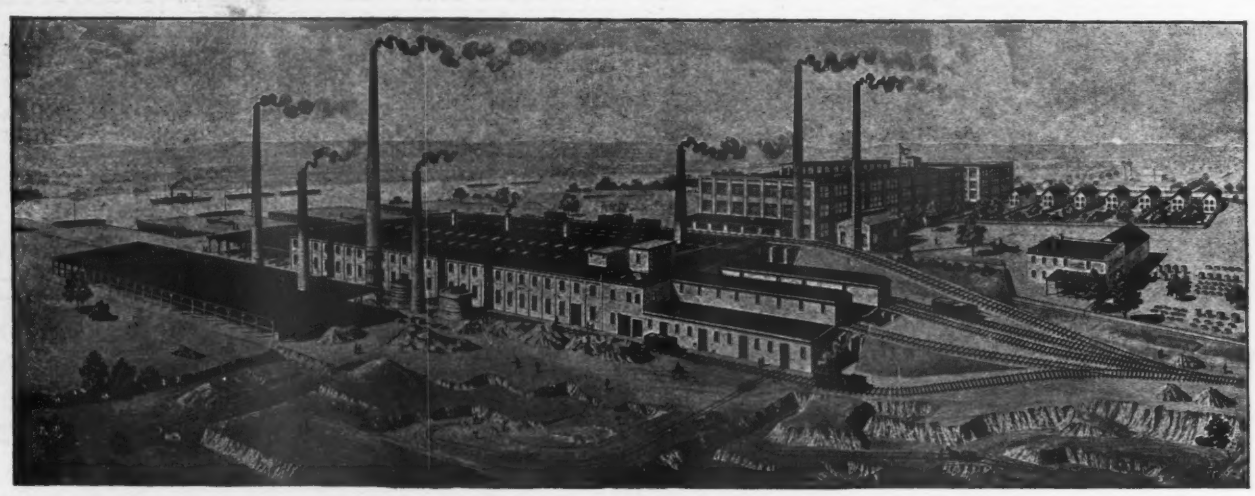

Our New Works at Keasbey, N. J.

Manufacturers of High-Class Refractory Material, Blocks, Retorts, Furnace Linings, Brick, Shapes from Imported and Domestic Raw Materials,

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Acid-Proof Stoneware of Every Description, from Single Pieces to Entire Plants. :: ::

Our works have been thoroughly remodeled by the installation of the most modern machinery and up-to-date processes minimizing cost of manufacture. Laboratory on the premises, equipped with all the requisite apparatus, assuring absolute uniformity of material, also enabling us to determine composition of material for specific purposes. Manufacture under the supervision of chemical engineers of broad experience and many years' training in this line.

ESTIMATES CHEERFULLY AND PROMPTLY FURNISHED. CORRESPONDENCE SOLICITED.

FREDERIC J. MAYER, General Manager.

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Benches.—We erect GAS RETORT BENCHES with Horizontal retorts having closed ends, or Through retorts up to 20 feet in length.

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ALL CONTRACTS MADE AS OF ST. LOUIS.

NON-CLINKERING BENCHES

EQUIPPED WITH

"THE MOUTHPIECE THAT DON'T COME OFF."

PROPOSALS FURNISHED ON EVERY TYPE OF INSTALLATION.

TRY OUR LITTLE "3-HOUR SCURFER."

Write for our Bulletin No. 2.

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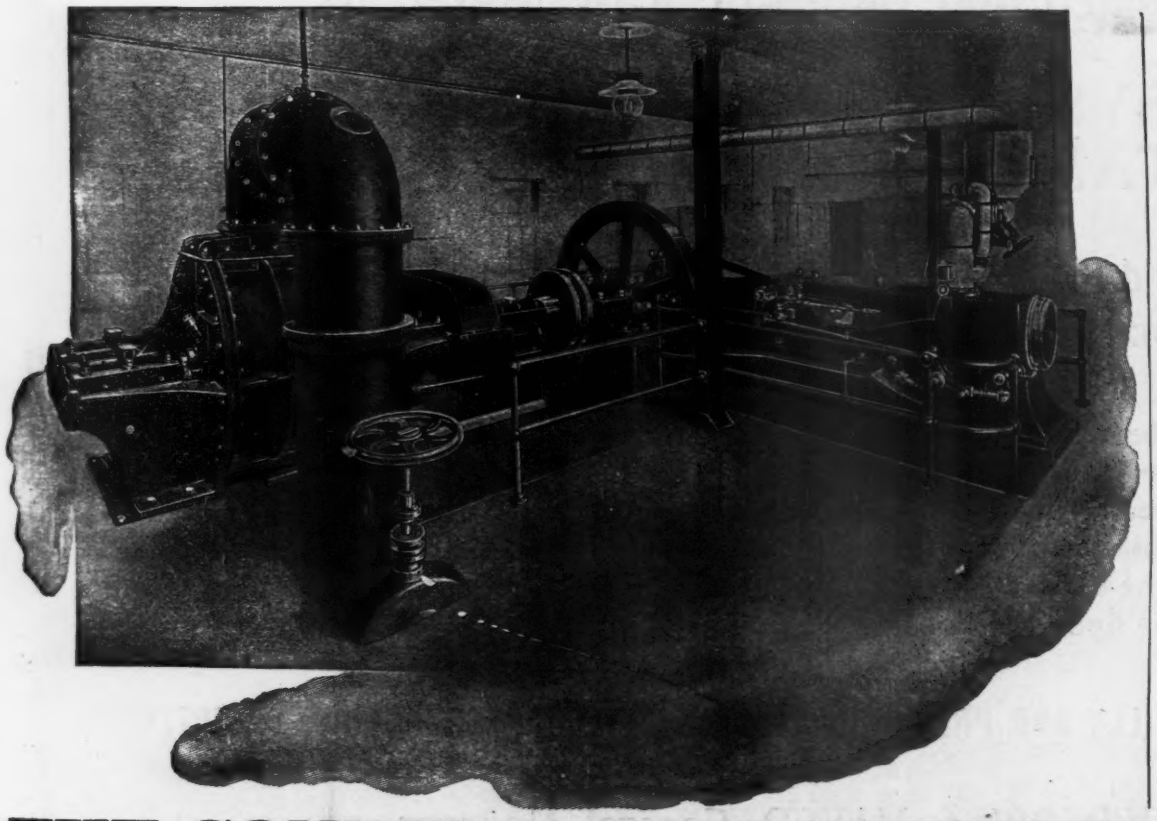
CONNERSVILLE GAS EXHAUSTERS

AND HIGH PRESSURE GAS PUMPS.



THIS cut shows one of our High Pressure machines and a 4-valve engine connected by one of our leather link flexible couplings. Two of these units were installed for the Peoples Gas Light and Coke Co., Chicago, at their 73d St. Station. Each machine has a capacity of 14,000,000 cubic feet per day.

We also manufacture

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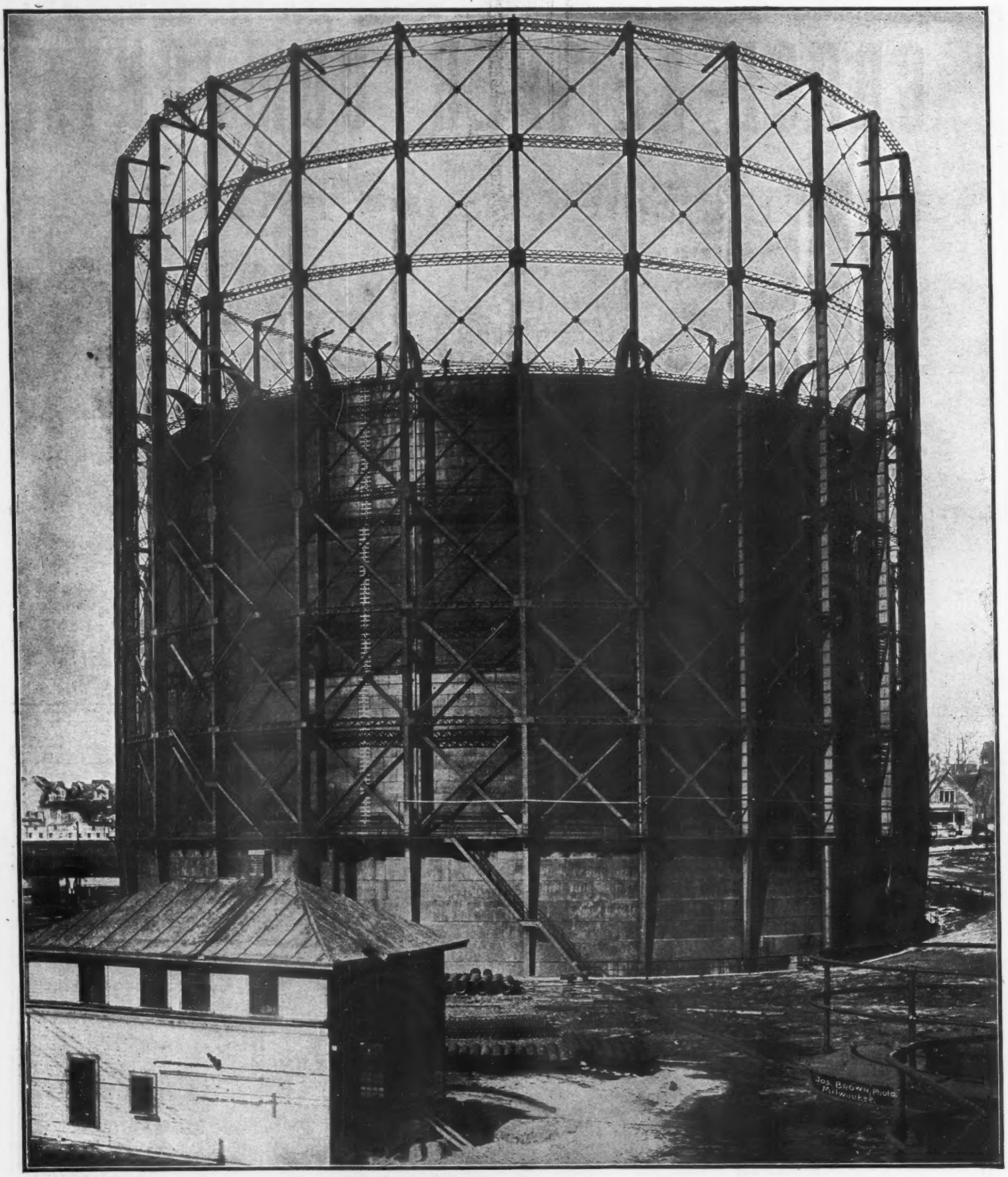
NEW YORK OFFICE, 50 Church Street. - - HORACE G. COOKE, Selling Agent.



The Largest Steel Tank Gasholder in the World, 225 Feet 9 Inches Diameter, 35 Feet Deep, Five Lifts.

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PLATE AND STRUCTURAL WORK OF EVERY DESCRIPTION.

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Gas Engineers and Builders.

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PRIMARY AND SECONDARY CONDENSERS FOR FRESH OR SALT WATER

ISBELL VALVES SPECIALS

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P. & A. TAR EXTRACTORS FOR WATER GAS

ROTARY AMMONIA SCRUBBERS

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ESTABLISHED 1865

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Double and Single Gate Valves, ¼" to 72",

—FOR—

Gas, Water, Steam, Oil, Ammonia, Etc.

HOT GAS VALVES A SPECIALTY.

Send for Catalogue.

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Plans and Estimates Furnished for Extension of Gas Plants or Construction of New Works.

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High Grade Firebrick, Blocks, Tiles,

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Works: Maurer, N. J. Office: 420 E. 23d St., N. Y. City.

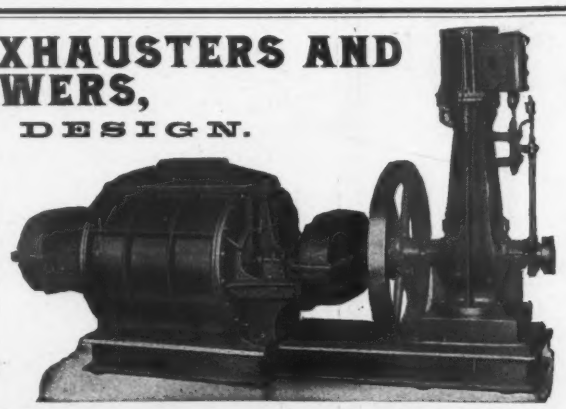
POSITIVE GAS EXHAUSTERS AND BLOWERS,

LATEST DESIGN.

Most Simple and Efficient Machine on the Market. Let us figure on YOUR requirements.

THE PIQUA BLOWER CO.,

PIQUA, OHIO.



Practical Handbook on

GAS ENGINES,

With Instructions for Care and Working of the Same,

By G. LIECKFELD, C.E.

Translated with Permission of the Author

By GEO. M. RICHMOND, M.E.

Price, $1.

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EVENS & HOWARD FIRE BRICK CO. SAINT LOUIS

SOME OF THE ADVANTAGES.

MORE GAS PER TON OF COAL.

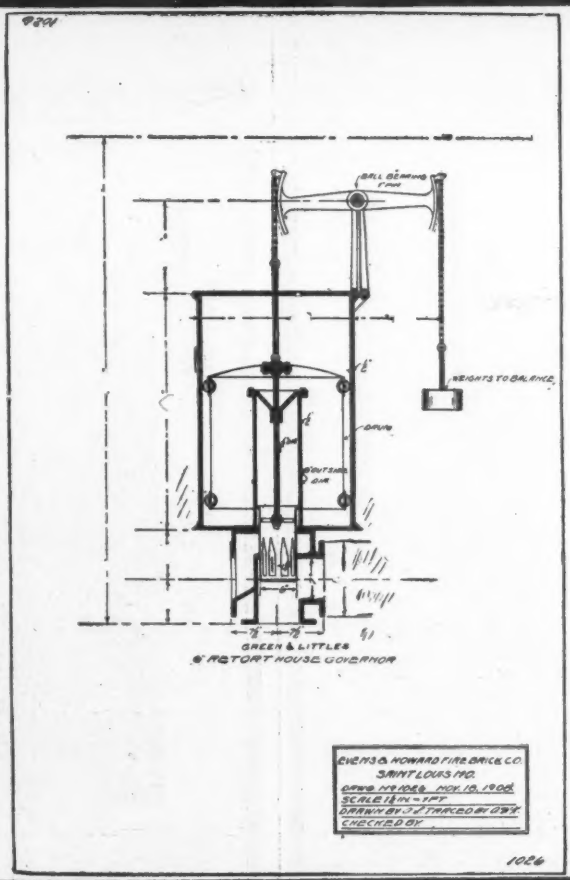
NO BACK PRESSURE on Retorts.

LESS CARBON on Retorts.

BETTER GAS.

REGULAR Illuminating Quality.

Even with unskilled or green men in the retort house one regular quality of gas is made. There is no risk of pulling in air or forcing gas back through the retort into the settings. Seal on dip pipe can be reduced to ⅛ of an inch.



GREEN & LITTLE'S GOVERNOR FOR RETORT HOUSE MAIN.

PATENT PENDING.

DETAILS AND PRICES ON APPLICATION.

SEVERAL ON ORDER.

COST IS LOW.

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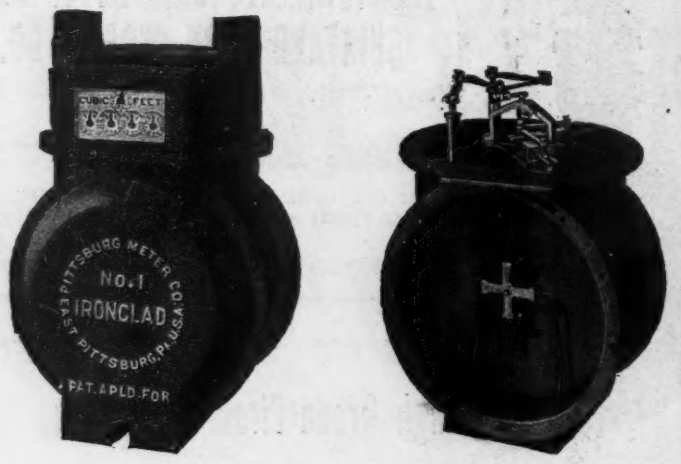

"IRONCLAD"
Dry Gas Meter

With Cast-Iron Case.

¶ Capacity with $\frac{3}{10}$ inch absorption, 120 cubic feet per hour.

¶ Capacity with $\frac{5}{10}$ inch absorption, 170 cubic feet per hour.

¶ Has all the advantages of tin meters, with addition of cast-iron case.

¶ Will not rust.

¶ Has no solder seams to part.

See Catalogue G-I for full particulars.

Pittsburg Meter Co.

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New York Office, 149 Broadway.

Manufacturers of Large Capacity and Ordinary Capacity Gas Meters, Prepayment Meters, Proportional Meters and Meter Provers.

LLOYD CONSTRUCTION COMPANY

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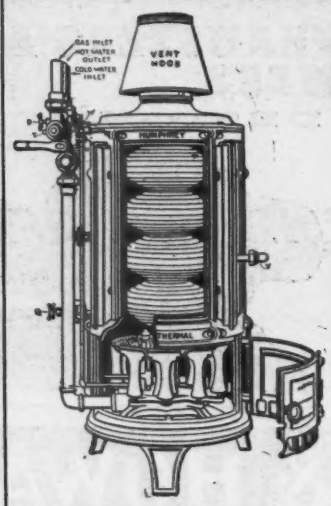

Humphrey Auto-Thermal Instantaneous Water Heaters

Have every known desirable feature helping to efficiency, economy, durability and absolute safety.

FULLY GUARANTEED.
PRICES LOW.
QUALITY AND SERVICE HIGH.

Will you help us sell them?

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FOR THE

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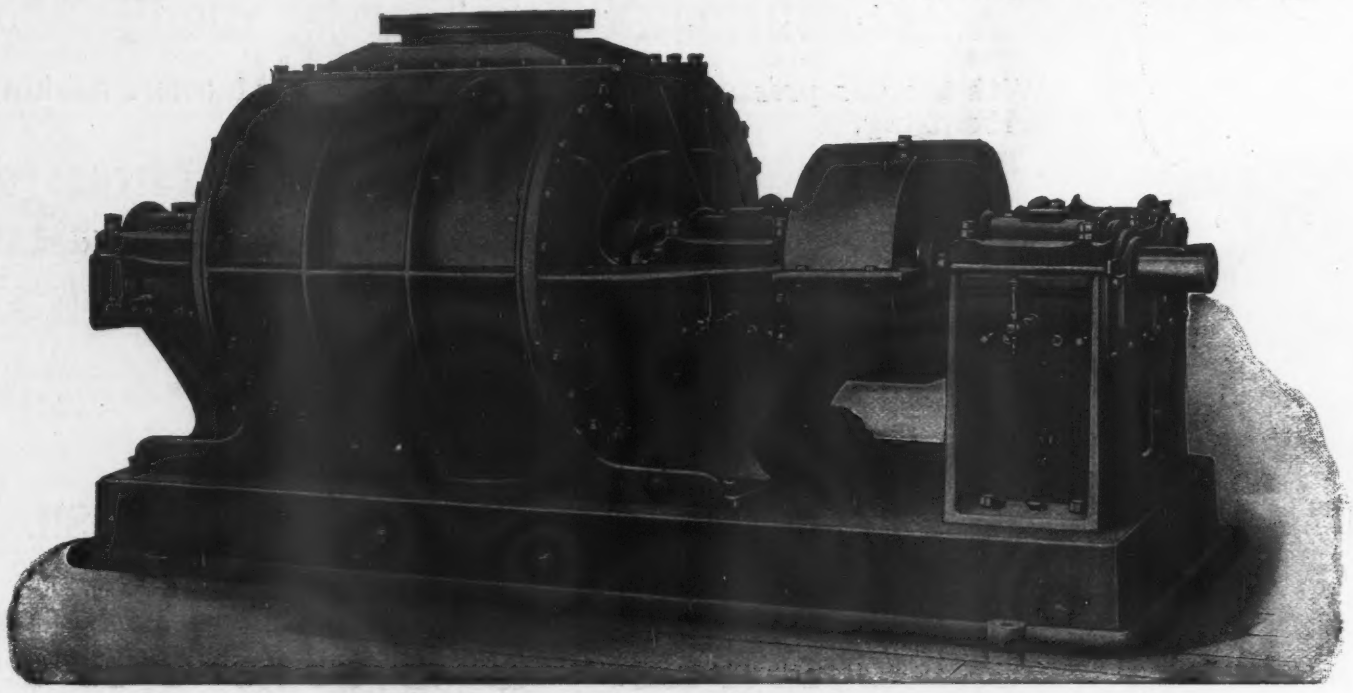
The highest efficiencies obtained. Most perfect devices for adjustment and maintenance of proper alignment. Use our flexible coupling to correct troubles caused by misalignment and engine shaft thrust. Our gas governor is the best. By-pass, gas valves and fittings.



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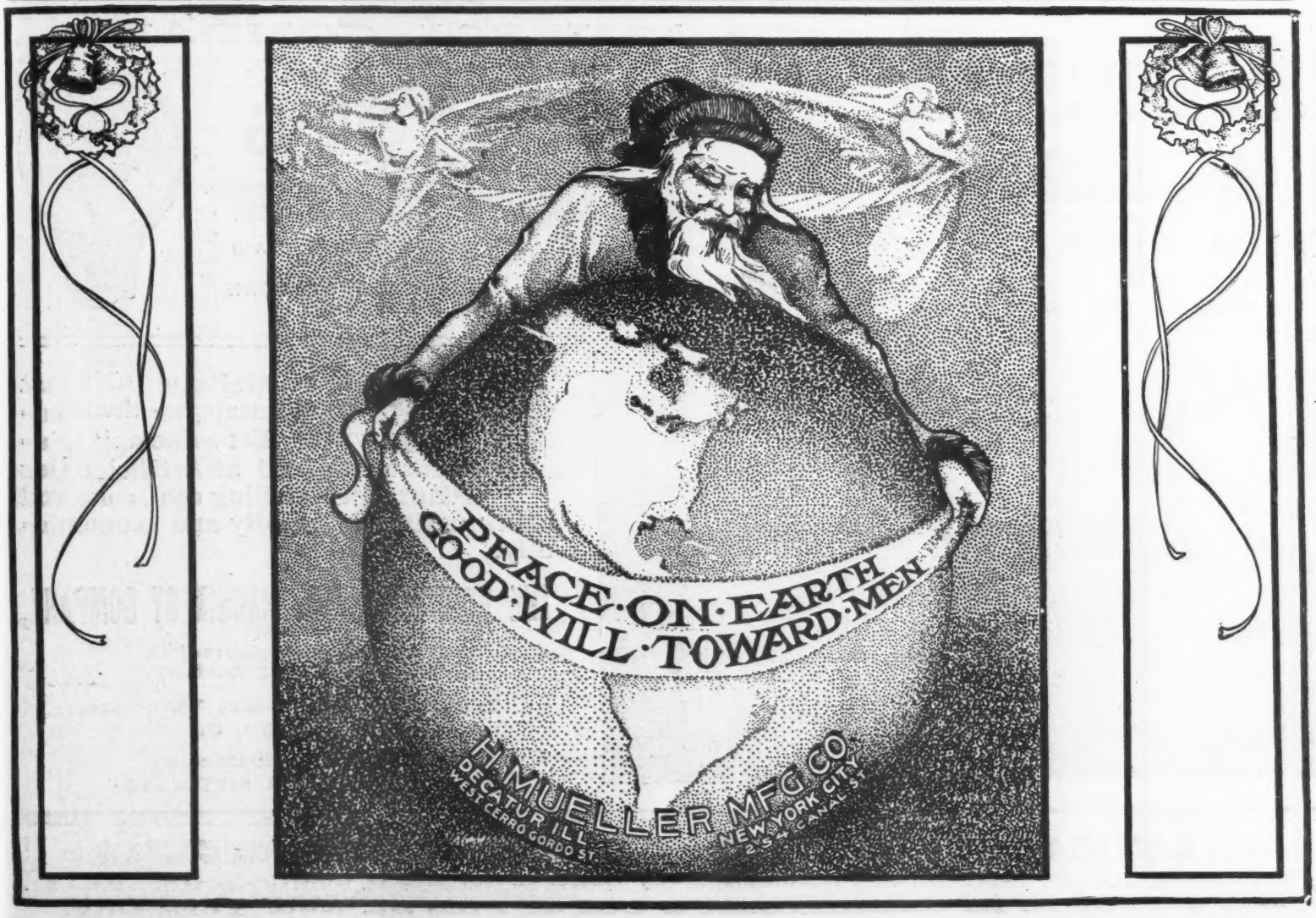

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WERE THE SENSATION OF THE CHICAGO SHOW.

With the gas pressure at 8-10ths and with other burners flashing and carbonizing,

THE BRAY INVERTED

filled the mantle perfectly and without a single flash back.

If you were at Chicago you know this to be a fact.

BRAY QUALITY COUNTS.

ORDER SAMPLES. YOU CAN SEND THEM BACK IF YOU WISH.

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MANUFACTURERS OF

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Also, FLANGE PIPE, LAMP POSTS, Etc.

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Manufacturers of

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BRISTOL'S

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RECORDING PRESSURE GAUGES, RECORDING VACUUM GAUGES,
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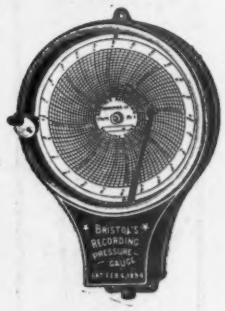
AND

THE WM. H. BRISTOL ELECTRIC PYROMETERS AND PATENT SMOKED CHART RECORDERS.



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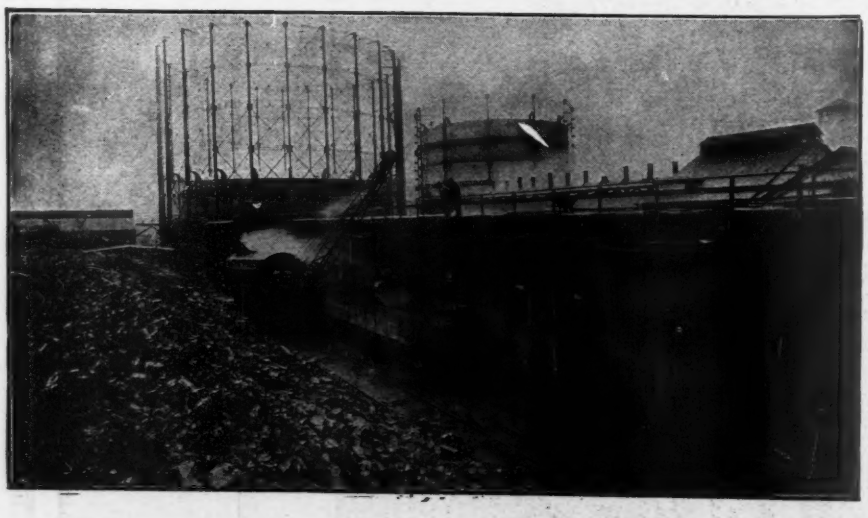

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THE BROWN HOISTING MACHINERY COMPANY,

Designers and Builders of All Kinds of Hoisting Machinery.

Main Office and Works:
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PRACTICAL HANDBOOK ON GAS ENGINES, WITH INSTRUCTIONS FOR CARE AND WORKING OF THE SAME,

By G. LIECKFELD, C.E. Translated with Permission of the Author, by GEORGE M. RICHMOND, M.E. Price, $1.

For Sale by A. M. CALLENDER & CO., 42 Pine St., New York City.

AMERICAN METER CO.,

NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Photometrical and Experimental Apparatus.

PUBLIC LIGHTING TABLE.

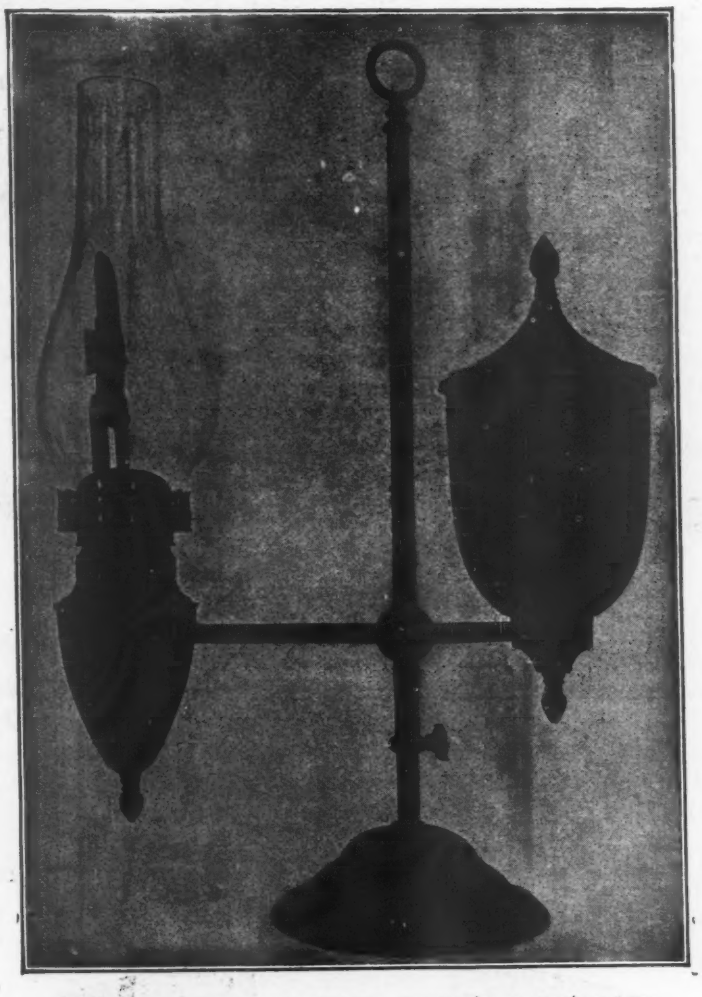
JANUARY, 1909.

Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.
Fri.	1	2.20AM	6.20 AM
Sat.	2	3.30	6.20
Sun.	3	4.30	6.20
Mon.	4	5.40	6.20
Tue.	5	No L.	No L.
Wed.	6	No L.FM	No L.
Thu.	7	No L.	No L.
Fri.	8	5.20PM	7.50PM
Sat.	9	5.20	8.50
Sun.	10	5.30	9.50
Mon.	11	5.30	10.50
Tue.	12	5.30	11.50
Wed.	13	5.30	12.50AM
Thu.	14	5.30LQ	1.50
Fri.	15	5.30	2.50
Sat.	16	5.30	3.50
Sun.	17	5.30	5.00
Mon.	18	5.30	6.20
Tue.	19	5.30	6.20
Wed.	20	5.30	6.20
Thu.	21	5.30NM	6.20
Fri.	22	5.30	6.20
Sat.	23	5.30	6.20
Sun.	24	5.40	6.10
Mon.	25	5.40	6.10
Tue.	26	10.00	6.10
Wed.	27	11.10	6.10
Thu.	28	12.20AM FQ	6.10
Fri.	29	1.20	6.10
Sat.	30	2.30	6.10
Sun.	31	3.30	6.10

TOTAL HOURS DURING 1909.

By Table No. 1.

	Hrs.Min.
January	212.20
February	183.40
March	173.00
April	151.10
May	144.10
June	138.50
July	145.40
August	160.30
September	180.00
October	201.00
November	216.30
December	233.40
Total, yr.	2140.30



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❋❋❋

10-Candle Power.

❋❋❋

This lamp is a perfect substitute for the 10-candle Pentane Lamp hitherto used, and has the following advantages:

1st. It uses Standard Kerosene Oil (Pratt's Astral Oil or equivalent).

2d. It is remarkably steady. Will burn 24 hours continuously with less than 2 per cent. variation.

3d. It is much less dangerous than Pentane, which is a kind of gasolene.

4th. It is not easily affected by air currents in the photometer room.

5th. Since the lamp may burn continuously, the candle power of gas may be taken at any moment, if necessary. This insures steady illuminating power without waste of carburetting material.

6th. The first cost of the lamp brings it within the reach of even small gas works.

7th. Costs much less to maintain than a Pentane lamp or sperm candles doing the same service.

8th. Is not affected by the weather.

PUBLIC LIGHTING TABLE.

JANUARY, 1909.

Day of Week.	Date.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Complete Lighting in One Hour	Complete Extinguishing in 50 Minutes
		From Time Given	
		P. M.	A. M.
Fri.	1	4.12	6.27
Sat.	2	4.12	6.27
Sun.	3	4.12	6.27
Mon.	4	4.12	6.27
Tue.	5	4.12	6.27
Wed.	6	4.12	6.27
Thu.	7	4.12	6.27
Fri.	8	4.22	6.22
Sat.	9	4.22	6.22
Sun.	10	4.22	6.22
Mon.	11	4.22	6.22
Tue.	12	4.22	6.22
Wed.	13	4.22	6.22
Thu.	14	4.22	6.22
Fri.	15	4.32	6.17
Sat.	16	4.32	6.17
Sun.	17	4.32	6.17
Mon.	18	4.32	6.17
Tue.	19	4.32	6.17
Wed.	20	4.32	6.17
Thu.	21	4.32	6.17
Fri.	22	4.42	6.12
Sat.	23	4.42	6.12
Sun.	24	4.42	6.12
Mon.	25	4.42	6.12
Tue.	26	4.42	6.12
Wed.	27	4.42	6.12
Thu.	28	4.42	6.12
Fri.	29	4.47	6.07
Sat.	30	4.47	6.07
Sun.	31	4.47	6.07

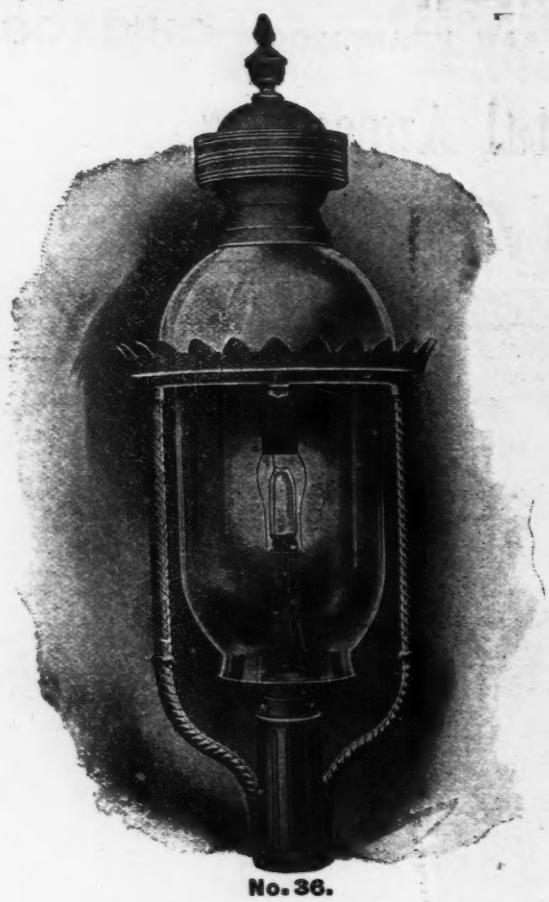
TOTAL HOURS DURING 1909.

	Hrs.Min.
January	428.30
February	358.15
March	353.10
April	298.10
May	263.20
June	234.45
July	248.30
August	278.00
September	311.25
October	370.05
November	397.40
December	438.35
	3980.25
Deduct on account of 50 min. extinguishing time	30.25
Total, yr.	3950.00

NEW YORK, 318 West 42d Street.
BOSTON, 820 Beacon Building.
PHILADELPHIA, Broad and Arch Streets.
ST. LOUIS, 712 Roe Building.
CHICAGO, 218 La Salle Street.
SAN FRANCISCO, 512 Oak Street.

WELSBACH STREET LIGHTING COMPANY

....OF AMERICA....



No. 36.

Controls and Operates the **Welsbach System of Street Lighting,**

Which includes its specially DESIGNED and PATENTED BURNER for PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others interested in Municipal and Outside Lighting.

No. 38.

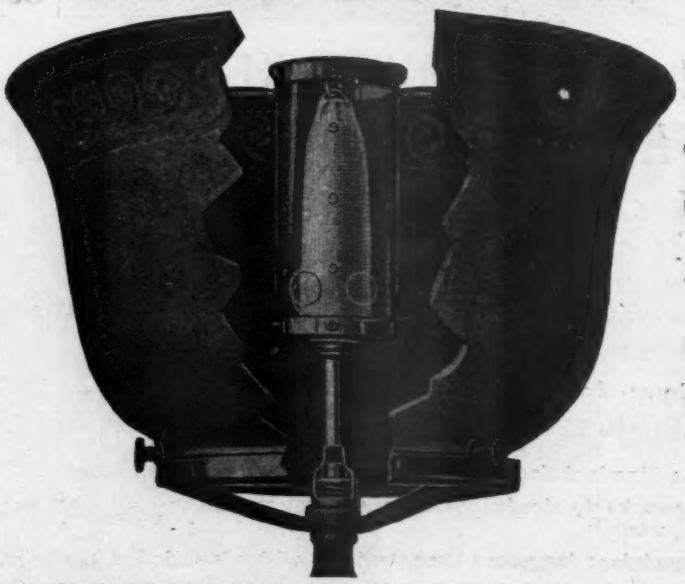
Welsbach Junior

THE BIGGEST LITTLE LIGHT IN THE WORLD.

The Welsbach Junior Light is 5 inches high--consists of burner, mantle and chimney--and is attractively boxed in a pasteboard carton.

—o—

As its effectiveness and economy become better known the Welsbach Junior will supersede, for universal use in the home, the old-style open flame gas burners.



Showing Welsbach Junior Light used in connection with ordinary glass globe.

Gives 50-Candle Power.

Uses Two Feet of Gas per Hour.

Attaches to Any Gas Fixture.

Completely Hidden from View.

Use your own globe--either gas or electric.

SMALL—EFFICIENT—ECONOMICAL.

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Salesrooms in all Leading Cities of the United States.

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SOLE AMERICAN BUILDERS

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Winsted, Conn. (2d contract).
Nashua, N. H.
Augusta, Me. (2d contract).
Everett, Mass.
Jenkintown, Pa. (2d contract).
Coney Island, N. Y.
Mexico, Mo.
Jacksonville, Fla.
Syracuse, N. Y. (2d contract).
Atlanta, Ga. (2d contract).
Holyoke, Mass.
Peoria, Ills.
Schenectady, N. Y. (2d contract).
Danbury, Conn.
Galveston, Tex. (2d contract).
Quebec, Canada.
Indianapolis, Ind. (2d contract).
Bessemer, Ala.
Waterbury, Conn. (5th contract).
Sioux Falls, S. D. (3d contract).
Philadelphia, Pa.
New Hartford, Conn.
Poughkeepsie, N.Y. (2d contract).
Nashville, Tenn.
Salisbury, Md.
Norfolk, Va. (4th contract).
Wallingford, Conn.
Richmond, Va. (2d contract).
Oak Bluffs, Mass.
Arlington, Mass.

TOTAL SETS INSTALLED DURING YEAR, ... 43
TOTAL SETS INSTALLED TO DECEMBER 31, 1907, ... 677
TOTAL DAILY CAPACITY, TO DECEMBER 31, 1907, ... 545,865,000 cu. ft.

Tar Extractors for Carburetted Water Gas.
Photometrical Apparatus.
Gas Analysis Apparatus.
Recording Gauges.
Straight Standpipe System for Coal Gas Retorts.
Straight Standpipe Cleaners.
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Manufacturers of all Material for the Construction of Coal Gas Benches.

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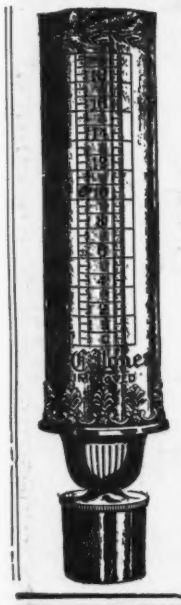

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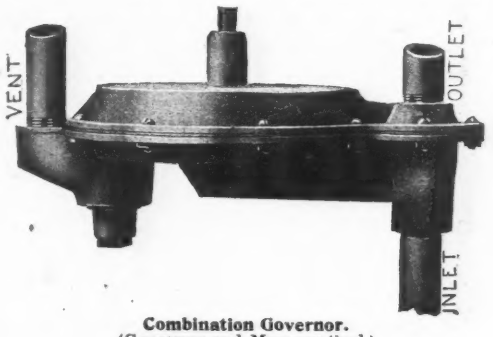

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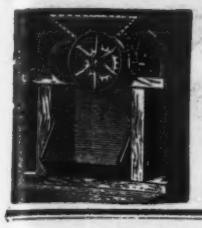

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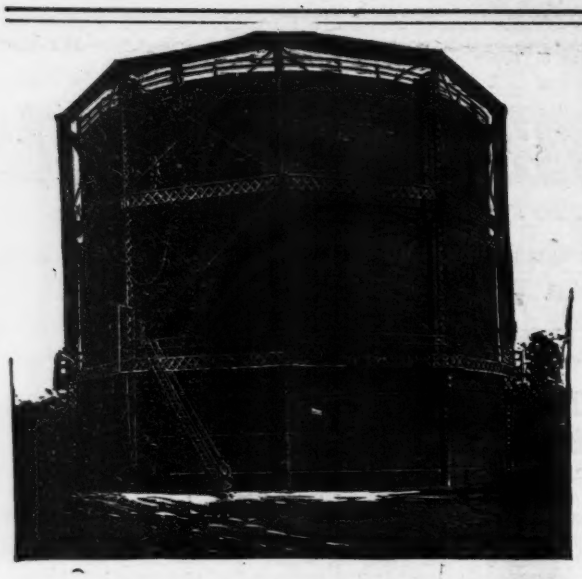

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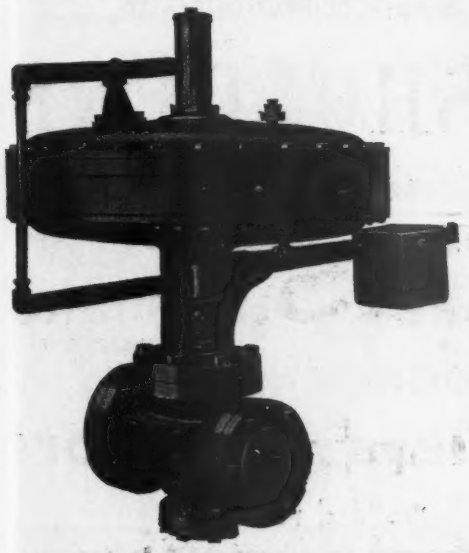

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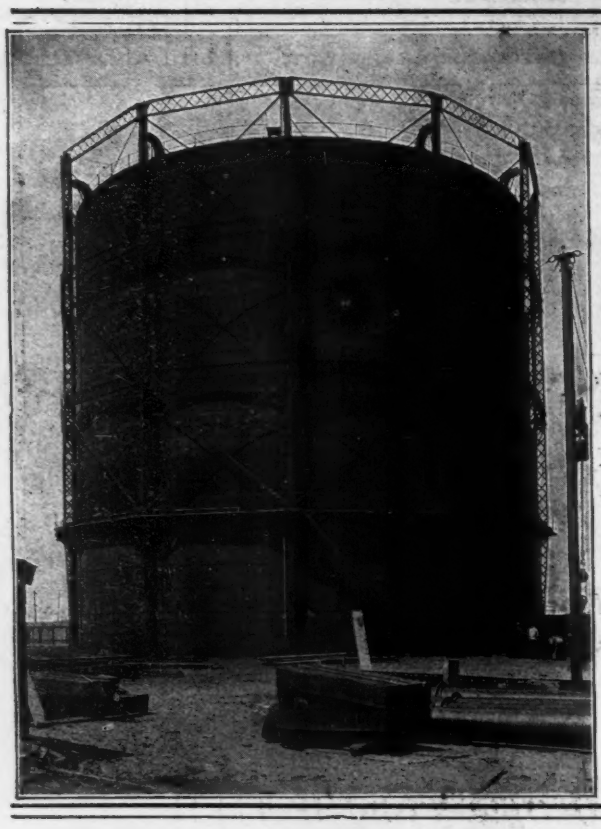

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